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General Articles

SCIENTIFIC PRODUCTION OF MILK*

P. F. DOLAN, M.R.C.V.S., D.V.S.M.

CHIEF VETERINARY INSPECTOR, CORPORATION OF DUBLIN

This paper is solely concerned with the public health aspect of the production of milk: there are other aspects, such as feeding and recording, which are not included. It is but a brief communication, but it will be followed by a number of lantern slides, in the hope that many additional points will be covered by these.

The scientific production of milk from a public health point of view is the obtaining of the milk from the cow and the giving of it to the consumer as a safe and raw milk in a sealed bottle or other suitable container.

The ideal which I set before you is the taking of the milk from a healthy cow by suction over a cooler and that it shall immediately be bottled without being touched by a human hand or exposed to human contamination. It is extraordinary, taking circumstances into consideration, how very near we are to this ideal. I know that there are some, perhaps many, who will say that this is absurd—that it is not practicable, and could not be carried out by the ordinary milk producer. My answer is that high-grade milk can only form a small percentage of the total milk produced. At one time I would have been satisfied with 5 per cent. as far as Dublin is concerned, now I am looking for 15 per cent.; perhaps in the future we may be aiming at a higher percentage.

There is one thing about milk that amazes me, and that is the big jump from one extreme to another. Ten years ago it was difficult to obtain for children a tubercle-free milk. Twenty years ago milk was produced under very bad conditions and it was seldom that the consumer took an interest. To-day one finds members of the public criticising important details and a typical example is our present method of capping milk bottles. There is a vast difference in the capping of milk bottles, as carried out to-day, and the milking of cows under bad conditions into wooden pails which were also used for the feeding of the cows, a practice commonly adopted 20 years ago. It is not my intention to describe the bad methods adopted in the past. Rather than turn people against milk we should promote increased consumption, provided that it is of a safe milk.

The water supply is one of the most important factors on dairy farms. From the public health point of view, perhaps *the* thing is to prevent any possibility of contamination by the typhoid bacillus. I think if this is taken as a standard the water supply is likely to be safe. Where the water is from a public supply it is assumed that it is safe, but in many cases it will be found that the water is from a deep boring, a deep well or shallow wells and springs. The deep boring is likely to be all right, the deep well requires examination and proper construction, and the water from shallow wells and springs should be filtered. It is important to distinguish between shallow and deep wells and to recognise that a shallow well may be deeper than a deep well. From my experience of, and investigations on, dairy farms I have found that the owners have displayed a ready interest in a suitable and safe water supply. On most farms the water supply is perfect and causes little trouble or worry, but on some it has been the biggest problem on the farm and in these cases it is to be noted that by applying the proper knowledge and interest, the water problem can be solved. The important points are to have an abundant and a safe supply.

In addition to having the water safe it is a great benefit and a great saving to have it at such a low temperature that it will cool the milk in summer to 60°F. It may be taken that the deep borings and many of the deep wells will supply water of this nature. With shallow wells and springs, generally speaking, the water will not be capable in the summer time of cooling the milk sufficiently and it will be necessary to instal a refrigerating apparatus to cool the milk. The same applies to public water supplies.

It will be usually found necessary to pump the water to a tank above the farm buildings. It is important to have this tank covered with a non-conducting material to prevent the temperature of the water in the tank rising, and the tank should be emptied and refilled immediately before milking. In my experience high bacterial counts have been due to the temperature of a good water supply rising on account of its exposure to atmospheric temperature or to the sun. When there is a separate pump the

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water may be pumped direct from the deep boring or deep well through the cooler, provided that care is taken to see, by the installation of a safety valve or by other means, that the cooler is not burst or damaged. The water from the cooler should be collected for further use, such as washing of the cowsheds and other buildings.

The cooling of the milk, which of course is an essential procedure, is closely connected with the water supply. As a rule, if the water is not able to cool the milk to 60°F., a refrigerating apparatus will be necessary. In my opinion, the farm on which the water supply is capable of bringing the temperature of the milk down to the proper degree, is in the best position. The installation of a refrigerating apparatus tends to careless methods, careless attendants, and careless owners. It is not my intention to discourage persons who have been forced to instal refrigerating machinery on account of the water supply, but rather to make them be careful, and to realise the pitfalls of refrigeration. I am satisfied that a great deal of damage has been done to producers who have been lulled into a false sense of security and careless methods by refrigeration. The point I want to emphasise is, that refrigeration tends to cover dirty and careless methods. This leads up to a view which I have often expressed, that inspection at the source is an essential part of milk production. Up to now I have found that it has been necessary to advise the removable type of cooler, that is, the cooler that can be taken down, washed, rinsed, and put into the sterilising chest. From those who advocate the fixed type of cooler we must get a guarantee of proper washing, rinsing and sterilisation of the cooler in position, a procedure which I have found difficult and many times unsatisfactory. It is necessary for those who are interested in the fixed type of cooler to realise that proper washing, rinsing and sterilisation of the cooler are essential, and more progress should be made in making these processes easier and more efficient.

Bacterial counts are an essential part of the production of milk and without them little progress could be made, but they are of little use without inspection at the source. I would like to emphasise this statement, as inspection at the source is of as great importance as are the bacterial counts. It is essential that the laboratory procedure in making bacterial counts and regulations in taking samples of milk be standardised. Without these, bacterial counts are of little value. Bacterial counts are of great guidance and are of great educational value to producers, but, on the other hand, they may be, and are in some cases, a source of bad methods and carelessness. In other words, sterilisation of the utensils and the efficient cooling of milk, especially by a refrigerating apparatus, will be followed by low counts, of which advantage may be taken to cover up dirty methods of milking and carelessness in the handling of the utensils. This is the reason for my plea for inspection at the source in conjunction with bacterial counts. Another essential point with regard to bacterial counts is that the standard for the summer period should be different from that of the winter period. I do not know of any legislation that has embodied this point and outside the Infant Aid Society of Dublin I do not know of any recognition of this important fact. Let me emphasise that low bacterial counts are easy of attainment during the winter periods; therefore the standard for the winter period should be much stricter than that for the summer period; for example, if the standard for the summer period be 100,000 organisms per c.c., that for the winter might be 20,000 or less.

There are four major factors influencing bacterial counts—efficient cooling of the milk; sterilisation of the utensils and appliances with which the milk comes in contact; the time that elapses between production and the examination of the samples; and atmospheric or controlled temperature. There are other important factors, such as badly-constructed pipe lines of milking machines and worn or unsuitable utensils.

The methods of milking adopted at present are: hand milking, machine milking, and a special type of milking in a milking shed attached to the dairy. Where attention is paid to details good results may be obtained by all three methods.

Hand milking must be dry milking—wet milkers must be eliminated—whilst the use of a covered pail is a necessity. There is no need for me to talk further on this method, as you must be familiar with the hand milking of cows.

Machine milking requires very special attention to details, such as washing, rinsing, and sterilisation of all the parts with which the milk comes in contact and, in addition, the rubber tubes which are attached to the milk units. Everything from the pipe line, with the exception of the pulsator, must be washed and sterilised twice daily. The pipe line must be properly and securely installed with suitable falls to the drain taps, and these pipe lines should be washed out regularly and drained immediately before and after milking. Perhaps it is necessary for me to explain that the milk goes direct from the cow to the milk pail and does not come in contact with the pipe line unless it be in those cases where there is carelessness and the milk pail is allowed to overflow. Carelessness in the installation of these pipe lines may lead to trouble which may be difficult to locate. The attendant must pay

proper attention to the cow during the process of milking and it is especially necessary that he be with the cow before the machine is ready to come off. The cowshed must be very clean during the process of milking. The milk is carried in the milk pails from the cowsheds to the dairy and it is usual to construct the dairy in such a way that there is no necessity for the attendant carrying the milk to enter the dairy. Milking machines have given good results and have many advantages, but one cannot expect them to be successful unless the proper degree of care is taken. Carelessness in the use of milking machines will be followed by bad results and it is a pity to blame the milking machine for this carelessness.

Stripping of the cows is commonly adopted after the use of milking machines and, from a public health point of view, it is necessary for me to say that the elimination of this stripping is most desirable. It is difficult to break down established customs and to change rooted ideas; nevertheless, I believe stripping should be, and can be eliminated; indeed, it is being eliminated by some producers who realise that the public health aspect of milk production is of the first importance. It has been said that the elimination of stripping may be followed by mastitis, low yield, poor milk and cows not reaching the normal lactation period. My reply is that these faults are only too common in hand-milked herds. There is a great case for the elimination of stripping.

The milking of cows in a special shed attached to the dairy offers the greatest possibilities in the production of high-grade milk and eliminates many of the obstacles met with in the change over to the production of this grade of milk. The cow comes from her position in the cowshed to washing stalls, where she is washed and dried, and then moves forward to a special milking shed beside the dairy, where the milk is taken from her by suction to the dairy, where it is cooled and immediately bottled, the cow then proceeding to her position in the cowshed. It is easy, with proper handling, to train cows to adopt this routine and no difficulties are met with in this respect. Although this special milking shed forms part of the dairy it is completely separate from it and the workers attending the cows have no access to the cooling and bottling of the milk. I believe that this is the best method and the method of the future, and I see little objection to it being adopted on most high-grade farms. I must admit that to suggest this procedure to an ordinary dairy farmer who is not interested in the public health aspect of the production of milk would be to meet with adverse and perhaps offensive criticism.

Whatever method of milking is adopted it is essential that all the appliances and utensils with which the milk comes in contact be washed, rinsed and sterilised twice a day. The sterilisation is performed by steam provided by a dairy boiler. It must be carried out in an enclosed space and suitable sterilising chests may be readily purchased for this purpose. These chests must be of the right capacity to suit the boiler and it is of essential importance that they carry suitable thermometers, so as to ensure that all the utensils and appliances be subjected to a temperature of 212°F. for 15 minutes. Pails and bottles should be placed in the sterilising chest upside down to prevent condensation water lodging in them and parts of milking machines should be hung up in muslin bags, the metal parts separated from the rubber. As an alternative, the rubber parts may be boiled in a separate container.

The installation of a graph type of thermometer in connection with the sterilising chest ensures the efficient sterilisation of the utensils. This thermometer registers the temperature, its height and duration and although visible to the attendant it is not under his control.

On the question of the construction of cowsheds and on that of the alteration of existing cowsheds I would like to be brief and say that we should apply our present knowledge and not be influenced by old ideas and methods. In short, there is a great difference in dealing with the construction of new buildings and with the alteration of those in existence. Provided that we have sufficient natural light and ventilation and a suitable floor space there is little necessity to object to the alteration of existing cowsheds. I would like to go further and say that it is only on rare occasions that I have found the reconstruction of buildings impossible. It is not my intention to belittle good cowsheds. I am fully aware of their value, but we should be careful in condemning those in existence without making an effort to have them suitably reconstructed when the alternative is to prevent an owner from adopting the measures to produce a high-grade milk.

In the interests of the production of clean milk and in the prevention or elimination of the chief diseases which cause the losses to milk producers it is necessary to cleanse and to keep clean all parts of the cowshed, particularly walls up to five feet, troughs, drinking bowls, stall divisions, floors, channels and passages. This shows the importance of having these places and parts so constructed that they are easy to clean and keep clean. Where facilities are available the use of a high-pressure pump is invaluable.

I have not time to deal with the construction of the dairy in its relation to the washhouse, boiler house and other buildings and to the great value of electricity on the farm.

With regard to drainage, those of you who are connected with high-grade farms will appreciate the difficulties of this question on some farms. The main thing is to get rid of a large quantity of water and semi-liquid material. On some farms the drainage offers no difficulties, but on others the sedimentation of solids is necessary and this process tends to increase costs. The disposal of the drainage is different on many farms. In a limited number of cases it is through a sewer to a public drainage scheme. In others the liquid manure is used on the land, but in yet other cases the storage and carting of liquid manure does not appeal to the owner and other methods of disposal are adopted, such as through ditches—where an objectionable feature is likely to occur by the sedimentation of the solids in ditches or water courses between adjoining lands. There is a necessity here for the advice of the engineering profession in constructing suitable sedimentation tanks without materially increasing the costs of milk production.

The cleanliness of the cows must be regarded as essential and to facilitate cleansing it is necessary to clip the hair on the hind quarters and on the udders. Several years ago it was practically unknown to wash a cow and to suggest the clipping of a cow meant amazement on the part of the dairy farmers. The clipping and washing of cows is now general on high-grade dairy farms. The best results are obtained by the installation of a water pipe behind the cows so as to ensure that each cow is washed with clean water. After washing the cows must be efficiently dried, a procedure which offers no difficulties.

With regard to the disease-free cow, it is essential that there should be a complete veterinary examination and that the cow, after examination, should be suitably tagged and tattooed—and from a general experience I find that there is a necessity for tattooing. In some cases tagging is very successful, but in others it is a failure, due to the tags being inserted in a wrong place in the ear or unsuitable tags being used.

The chief diseases which concern us are tuberculosis, contagious abortion and mastitis. I have dealt with these diseases in a paper, "The Position of the Veterinary Surgeon in the Control of Milk, with special reference to Communicable Diseases"—which I prepared for the Congress held at Belfast this year—and it is unnecessary for me to discuss them much further. Where possible the self-contained herd system should be adopted to prevent the losses from contagious abortion and tuberculosis and I really think that the system is the more important in connection with the prevention of contagious abortion. There is a large number of herds which can never be self-contained and it is our duty to advise and help the owners of such herds; for this reason we should pay more attention to the principles of isolation and disinfection.

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Discussion

The discussion was opened by Mr. H. O'Leary, who said that he desired, first of all, to thank Mr. Dolan for, and congratulate him upon, his most instructive paper on a subject which was of paramount importance to the veterinary profession and especially so to the practitioner. Few knew the amount of work Mr. Dolan had done to raise the standard of milk supplied in the country. Even on Sundays he had seen him on his rounds to the different dairy farms, not alone in Co. Dublin but as far away as Co. Louth and Co. Kildare. Personally, he had found him always anxious to help, when anything should go wrong, to raise the bacterial count in dairies to which he (Mr. O'Leary) acted as veterinary surgeon.

This paper was one specially prepared for the practitioner: he said that because Mr. Dolan had not troubled them with the work done in the laboratories, such as staining for acid-fast bacilli or the procedure in connection with the biological test or the agglutination test for contagious abortion. All they had heard there that night was what every practitioner should know, because it was his advice which was sought by the dairyman when he was about to start a tubercle-free or an abortion-free herd or both, and a mistake at the start, whether it were in regard to the position of the byre, the length of the cow-bed, the drainage, etc., or as to the most economical way of setting up the herd, might be disastrous. Above all, practitioners should aim at keeping down unnecessary expense and try and prove to the dairy farmer that a high-grade milk supply did pay when carried out as it should be.

The compensations to the practitioner in a good, well-run herd were many. Periodic visits should be made to the farm by the practitioner when in the district without charging a fee, until such time as the dairy was well established and working smoothly. Owners of such herds would realise that the veterinary surgeon was a man who knew a little more than how to treat a sick animal; moreover, the stock became more valuable and his services were sought more often, and then a good fee could be demanded.

He believed that the practitoner and the profession in general could do much more than they had been doing to encourage more people to go in for the production of high-grade milk. They should first insist that the milk entering their own households should be tubercle-free and produced under the best possible conditions: they should also explain to their friends the dangers attached to the use of milk other than that produced under the above conditions, and he was sure, if this were done, that the number of tubercle-free herds in the country would be much greater than it was to-day.

He thought that there was nothing that he could add to Mr. Dolan's excellent paper. The latter had gone into the subject in detail from the practitioner's point of view and that was the aspect that interested him most. The sum total of his paper, as they would have noticed, was cleanliness, cleanliness, cleanliness and how it should be carried out effectively.

Two diseases which, in his opinion, were far

more serious, financially, to the dairy farmer than tuberculosis were mastitis and contagious abortion.

Mastitis had a fourfold effect:—

(i) The danger of milk from the affected quarter or quarters escaping detection until it was too late and the milk being distributed to the consumer, with the usual bad results of such contaminated milk to the consumer and the injury to the dairy farmer's business as a result of this.

(ii) There was the loss on the cow, because a cow that had had a bad attack of mastitis should not be allowed to remain in a healthy heard and when sold was worth little or nothing.

(iii) The danger of infection to other animals in the herd.

(iv) The discouraging effect it had on the farmer because, speaking for himself, he could honestly say that he could do little or nothing in mastitis, especially if the disease was well advanced. Here he would like to stress the point that pressure of some kind should be brought to bear on the government to encourage research in this direction.

In a well-run dairy the head man or steward should be held responsible for any case of mastitis escaping detection and he should personally examine the udders of each cow twice a day before milking and have suspicious cases removed immediately to what he might call the hospital shed and treated immediately after the other cows had been milked. He had found this method of dealing with mastitis to be most effective in preventing the spread of the disease and preventing sub-acute cases from becoming acute and chronic.

He was anxious to learn if any of the members there that night could give him any help in the treatment of mastitis. He had used fomentations of all descriptions with drawing of the "spins," internal treatment with formalin, anodyne ointments, blisters, mixed serum injections and injections of collosol iodine into the muscular system, etc., all with the same results. The one case to which he disliked being called was a case of mastitis, because he felt that he could do nothing.

Contagious abortion in a dairy herd, if not handled properly, was the one disease that would ruin any dairy farmer, should it enter, especially, into a herd previously abortion-free, because the organism appeared to progress by leaps and bounds in such a herd, with abortions occurring every other day. A practitioner when giving advice to his client about the setting up of an abortion-free herd should be careful, especially on those farms which were not self-contained. He believed it was impossible to maintain an abortion-free herd on farms where proper isolation of animals could not be carried out, and he was not satisfied that the freshly bought cow should be allowed to enter the clean herd even after she had passed her second test, six weeks or two months after purchase. In his view, she should be tested a third time and only then allowed to enter the herd, and before entering should be subjected to a thorough washing with disinfectant, especially when coming off land where there were other cattle that had not yet passed their third test. That might appear to most of them to be overdoing matters, but his experience had taught him that that was not so, and he had a particular herd in mind. Those of them who thought that they could set up an abortion-free herd on one test on a freshly-calved cow would be sadly disillusioned, as the agglutination test was not at all reliable in freshly-calved cows.

The procedure he would suggest was as follows: After having cleared the herd of reactors, all animals should be subjected to the agglutination test. Those animals that passed the test should be thoroughly groomed and washed with disinfectant. In six weeks or two months the animals were subjected to a second test and should they again pass they were then removed to another pasture and tested a third time after six weeks or two months; then, having passed, they were allowed to enter the clean herd.

If the herd was not self-contained, or the above procedure could not be adopted, he would advise his client not to attempt trying to set up an abortion-free herd; as a matter of fact, he would go so far as to say that he would be far better advised to buy animals known to abort, but only those that had calved after a full period of gestation, because such cattle had developed an immunity to the disease and were more than likely to continue to go full time and produce living calves. As far as the dairy farmer was concerned that was what he wanted. Half measures were certain to fail; therefore they must make sure that they impressed this upon their client and, should he persist in experimenting, they could always say, "I told you so."

Another pitfall into which a number of dairy farmers had fallen, especially around Co. Dublin, was going into the thing on too big a scale at the start: let them try and get their clients to creep before they walked; otherwise, they would not be able to get a sale for all their milk and would be inclined to cut prices, with disastrous results both to themselves and to their fellow tubercle-free milk producers, because the running of a properly-managed tuberculosis-free herd was expensive.

Another serious disadvantage of having a very large herd at the start was that proper supervision was not carried out, because the owner did not know enough about the business.

In conclusion, Mr. O'Leary expressed the hope that they they would have a very good discussion on Mr. Dolan's excellent paper.

Mr. J. J. Dundon, having thanked Mr. Dolan for his paper, which, he said, was well worth coming a long distance to hear, expressed agreement with his remarks regarding water supplies, the lack of efficiency of which was often the source of serious trouble. A plentiful and lasting supply of water was not available on every farm and its provision often entailed fairly large expenditure. He had seen the water tank placed under the roof of a high barn—this kept it very cool in the summer. Where clean milk production was the aim, attenfion to detail was one of the most important requirements. He was very interested in the slides, especially those showing some original ideas regarding the reconstruction of existing unsuitable buildings so as to meet the necessary requirements. One should be careful before asking producers to expend a large outlay on new buildings—the existing ones very often could be made equal to all demands by careful advice concerning their alteration.

The Government should help in the good work of clean milk production by a more liberal outlook towards the prices granted in some areas for tuberculin-tested and graded milks, where public supplies were paid for out of State funds.

Mr. D. Reeves commented that Mr. Dolan had presented a most interesting and informative paper, and dealt with a subject that would not be found in any text-book. He agreed that mastitis was the bane of the veterinary profession; in his opinion, no results could be hoped

for from treatment. The only hope in dealing with the disease lay in some method of eradication: that described by Minett and Stableforth, by which they eliminated chronic contagious streptococcic mastitis from a herd and kept the herd free from this disease for a considerable period, was a promising one. The question of research into mastitis should be taken up in this country and a start should be made with certain selected herds.

Mr. J. M. Crowe observed that the title "Scientific production of milk" apparently implied the elimination of the human element, but he questioned if that could be done.

Mr. Dolan had stated that the cows were not stripped after the use of the milking-machine, and that even though a certain amount of milk was left in the udder no serious ill-effects, such as mastitis, resulted, but he had admitted that there was a reduction in the butter-fat—and that to the extent of ½ to 1 per cent., which, to his (Mr. Crowe's) mind, was a big loss financially.

Mr. Dolan knew, and they had always been taught, that the fore-milk contained a large number of bacteria. Did he allow that part of the milk to mix with all the milk, or did he remove it independently, as should be done? Did he use a separate machine or some other method?

The production of milk as described by Mr. Dolan could only be carried out at considerable expense, and only by persons supplying large quantities in or near a city for human consumption, but this could not be done by farmers living in rural areas. The best one could expect in rural areas was staunch cleanliness without elimination of the human milker.

With regard to mastitis, which was described as the "bug-bear" of the profession, he must say he was in thorough agreement with Mr. Condon (who had recommended the use of silver albumen) provided one got one's case early.

In rural areas to get clean milk, legislation *per se* would not do; the purveyors of milk must be gradually educated by the part-time inspectors and then, with the help of legislation, they would, they hoped, get a clean milk supply.

He did not agree with Mr. O'Leary's suggestion that a head-man should go round to examine cows' udders before milking, as he considered that no man, even one of themselves, could examine a cow's udder properly while it was full of milk, and even when it was empty a case of tuberculosis of the udder was very often hard to detect.

With reference to the presence of contagious abortion in a herd and the danger of its communication to the human subject and causing undulant fever, that risk could only be eliminated by pasteurisation, until such time as the herd could be declared free from the disease.

The Reply

Mr. Dolan thanked the members present for the kind reception of the paper and lantern slides, and emphasised that the production of a high-grade milk was of great importance to the public and was a matter with which the profession must necessarily be closely connected.

He expressed to Mr. O'Leary his appreciation of his remarks and thanked him also for his interest and support in promoting the production of a milk of a high quality. With reference to research, in the case of mastitis it was hardly necessary to say that the fullest support should be given to the proper steps to be taken in the control of this disease, especially research work under practical conditions.

The suggestion that the agglutination test should be applied three times to animals before they were allowed to enter a herd would not meet with a ready acceptance. The three testings would probably overload owners with additional expense and trouble and in his (Mr. Dolan's) experience two testings proved quite satisfactory, due precautions being taken that the tests were carried out at the proper times.

Mr. Dundon had raised a number of interesting points, and he regretted that this contributor had had to leave the meeting.

Mr. Daly's remarks were of importance by reason of his interest in the different problems to be faced in the production of a high quality milk. [No report of Mr. Daly's contribution has been received.—*Editor.*] Although the capping of milk bottles with foil caps in place of paper discs was an improvement, the method was not perfect. Milking machines did occasionally fall off cows and the attendants should always be ready to prevent this occurring; the cows and surroundings should be in a thoroughly clean condition. The fact that certain cows failed to milk to the machine should not be put forward as an objection to the machine, as such cows should be eliminated. With regard to stripping, clean milking was not the important point—that was the human element, and the danger was not of high counts, but contamination by harmful organisms. Mr. Daly had taken great care in inserting tags into cows' ears, with the result that this was a satisfactory method in his hands, but for a general precedure, tattooing of the ears appeared to be the wiser method. Mr. Daly's suggestion that the rendering of herds abortion-free was impossible of achievement, would, if accepted, mean only one thing for the members of the public, *viz.*, pasteurisation, for the public were demanding disease-free milk following the descriptions of the cases of undulant fever in England and the publicity given to them in the professional journals. Vaccination for contagious abortion might not be in the interests of the production of high-grade milk.

BIRD AND ANIMAL SANCTUARIES

Mr. Ernest Thompson Seton, the Canadian naturalist and author, addressing members of the Society for the Preservation of the Fauna of the Empire, made a plea for sanctuaries for small bird and animal life, saying that they could be established in parks or in small woodlands adjoining towns. They should be fenced, and nesting places which were provided for birds should be dark and cat-proof. Children who fed the birds and squirrels in the sanctuaries soon established a bond of friendship with them that was a far better educative factor than any amount of scolding or correction.

Sometimes when lecturing he had induced people to start sanctuaries in their towns. In addressing Rotarians in a town in North-West Canada, he invited an offer of land, which was given by an old Scotsman. Other Rotarians paid for fencing, and the result was a permanent reserve for birds and small animals.

Mr. C. W. Hobley, secretary of the society who spent many years in East Africa, supported Mr. Seton's plea for preservation of the balance of nature in reserves for wild life. He said that there was an increase to several millions in wild beasts in a reserve in Tanganyika, which was attributed to the killing of several thousands of lions during the last decade. To restore the balance an ordinance was issued practically stopping the killing of lions in the reserve.

MEDICAL EDUCATION AND MEDICAL RESEARCH*

W. W. C. TOPLEY, M.D. (CAMB.), F.R.C.P. (LOND.), F.R.S.

Professor of Bacteriology and Immunology in the University of London at the London School of Hygiene and Tropical Medicine

We should all, I fancy, be hard put to it, if asked to explain what medical research means. For our present purpose we may take it as a convenient label covering a multitude of interrelated activities, all concerned, immediately or remotely, and sometimes very remotely, with the study of disease in man. Proceeding from this *ad hoc* definition, we may consider how our present medical curriculum fits people to work in different parts of this very extensive field.

Before doing so I should like to make two things clear. Firstly I am, in the main, thinking in terms of the whole-time research worker—the man who intends to devote himself to research, or to research and teaching, as opposed to practice. Secondly, I am airing personal opinions with which I have no reason to suppose that anyone would agree.

Words are tricky things, and I may easily fail to convey the meaning I intend, or to put the emphasis in the right place; so that I propose to start at the end, and state my conclusions quite clearly before I give my reasons for them. The theses that I am attempting to maintain are these:—

(1) That the present medical curriculum, in its usual form and including all such modifications of it as are in sight, however adequate it may be for the purposes for which it was designed, fails badly as a method of providing recruits for medical research, except, perhaps, in the strictly clinical field.

(2) That the reason why the medical curriculum fails, from the research point of view, is that, except in the strictly clinical field, the success of a research worker will depend more on his knowledge of the basic sciences on which medicine is founded than on his detailed knowledge of practical medicine or surgery in the clinical sense.

(3) That medical research, at least on its laboratory side, is not an activity that can profitably be adopted as an alternative to practice at some late stage of a student's career, but must be consciously prepared for, from his earlier university days onward.

* Based on an address delivered to the Cambridge University Medical Society on October 23rd, 1935. Reproduced, by permission of author and Editors, from *The Lancet*, ccxxx, No. 5862, January 4th, 1936, pp. 43-48.

The Background Needed for Research in Various Fields

In giving my reasons for these statements, it will be convenient to start by taking samples of different kinds of research workers, and considering the things they must know in order that they may work effectively.

Clinical Research

To preserve a proper sequence I am forced to start with a subject on which I can speak with no authority at all—medical research in what is, perhaps, its strictest sense, the acquirement of new knowledge in regard to disease by observations carried out at the bedside. The proper name for this is clearly clinical research. Speaking as an outsider, it has always seemed to me that clinical research, in the true sense of that term, demands a combination of qualities, and a breadth of knowledge, of a very exceptional kind. It may, I think, be laid down as an axiom that no one is likely to make any real advance in our knowledge of disease unless he has the scientific outlook—science and pseudo-science are poles apart. Pseudo-science is even harder to define than medical research; but since it is a very horrid and insidious intellectual infection, to which we medicos are freely and frequently exposed, it may be worth noting some of its signs and symptoms. One of the worst is the uncritical application to practical medicine of procedures derived from physiological or pathological principles under conditions where there is no evidence that those particular principles are applicable. I suppose that the exploitation of hormones, or of bacterial vaccines, can supply some of the most fearsome examples, just as, when used as they should be, these reagents afford some of the most striking instances of the scientific cure or prevention of disease. Another symptom of medical pseudo-science is a confusion of apparatus with method, a belief, for instance, that things done in a laboratory are necessarily more scientific than things done outside it. In the absence of a clear grasp by a clinical worker of the implications of laboratory tests, or of a close and personal liaison between workers in the laboratory and in the ward, this form of the disease can be very harmful. Perhaps the most insidious form in which pseudo-science can attack us is that of rationalisation—the tendency we all have to make up reasons as to why we do things, or why things happen, without submitting our reasoning to the tests of repeated observation and experiment that science dictates. If we give way to this, if we mistake a guess for a working hypothesis, and a working hypothesis for a well-established theory, then we are lost.

But the scientific outlook—the determination not to go beyond our evidence and to test each link in our chain of reasoning—is much easier

to maintain when the things we are thinking about do not matter very much to ourselves or anybody else. The more they matter, in this emotional sense, the harder it is to regard them as data for consideration, or problems for investigation, rather than as practical problems that have to be tackled somehow or other, and as quickly as possible. Now clinical medicine does matter very much, and I should say that the purely scientific outlook is, for the ordinary person, entirely impossible. If it were possible it would, I think, defeat itself; because the subject of clinical research is not sickness, but the sick person, and a lack of emotional understanding will render the clinician blind to half his problem. So we must make many demands of our clinical research worker. He must be able to separate from the mass of data with which his experience presents him those that can be dealt with on strictly scientific lines. These will, of course, often include the emotional reactions of the patient; but the clinician, in his capacity of investigator, must try to regard them as though they were figures in a sum, or the results of titrations, or steps in an argument. But also, and at the same time, he must do the best he can for his patient, and this means that he must often use measures which, as a scientist, he would regard as based on a very doubtful foundation of ascertained fact. The thing can be done. It *has* been done, and done supremely well by some of the great clinicians. It is of the utmost importance to medical science that it should continue to be done well in the future. But it demands a clarity and adaptability of mind of a very high order. I think, also, though here I speak with the greatest diffidence, that this field of work in the future is going to make even greater demands than it did in the past, when so much of the purely clinical territory remained unmapped. I should guess that it will not be easy for the clinical investigator of the future to go very far unless he is a master of some special technique which, in its essence, is non-clinical, though it is applicable to clinical problems. Or, perhaps, it would be truer to say that the man who relies on clinical methods alone—clinical in the restricted sense—will find his field of activity greatly restricted, while the man who has mastered some ancillary technique, chemical, or physiological, or pathological as the case may be, in addition to his clinical training, will find problems in plenty waiting for solution. I do not, of course, mean that he must be a chemist, or a physiologist, in the broad sense, as well as a clinician—that, I suspect, would be an impossibility. But, if he is to work in any of those borderlands that call so urgently for exploration, he should be expert in that limited non-clinical field which he hopes to apply in his clinical studies. Of one thing I feel very sure, clinical research in the true sense will never consist in engaging other people to make a host of tests and examinations, using techniques which one has not mastered oneself, and then trying to add the results together. It is, of course, obvious that there are medical problems that demand for their solution the application of methods drawn from several different branches of science. But the proper method of approach to such problems is the method of team-work—a question that I hope to discuss later. Those who desire a more detailed and authoritative account of clinical research than I can offer should refer to the Huxley lecture given by Sir Thomas Lewis.[1]

Laboratory Work in Hospitals

Having ventured over a frontier which, perhaps, I should never have transgressed, I can turn to what is, to me, more familiar ground. The laboratory worker, to use a useful generic label for the multitude of scientific activities that are ancillary to medicine, has fewer demands made upon him than has the research worker in the wards. He is not, in general, responsible for the care, or treatment, of the sick person, and this makes it much easier for him to view his facts dispassionately, and to treat them as data which gain significance only in so far as they add together to form an ordered whole on which at least a tentative conclusion can justifiably be based. But it is clear that the term "laboratory worker" is almost as vague and elastic as "medical research." There are those who work in the laboratories attached to our great teaching hospitals, and even among these there are significant divisions. Of clinical diagnostic pathology I do not wish to say much. A great part of it, in my personal view, belongs to the domain of clinical medicine rather than pathology; for I do not see why the clinician's technical armoury should be limited to the instruments and methods that past generations happened to employ. The clinical pathologist must clearly be at least a competent clinician as well as a laboratory worker—competent in the sense of having an intimate knowledge of disease as it occurs in man, and an ability to weigh clinical evidence, though not necessarily the ability to obtain that evidence for himself.

When we view pathology—including under that term bacteriology and chemical pathology—from the angle of the hospital medical school rather than from that of the ward, the connection with the sick person, as such, becomes more remote. We are now hardly concerned at all with the fate of Mr. A. or Mrs. B., not at all, in our professional capacity, with their happiness or well-being apart from the particular disease from which they are suffering. Indeed, we never meet them as human beings. In so far as our humanitarian aims and aspira-

[1] *The Lancet*, 1935, i., 723.

tions are concerned we shall not be attempting to cure them of cancer, or tuberculosis, or any other malady, but we shall hope that, through our own efforts and those of the workers who follow us, the time will come when no Mr. A. or Mrs. B. need die of these particular diseases. We shall realise, moreover, that the more we can put the present Mr. A. and Mrs. B. out of our minds, and concentrate on the disease as apart from the individual, the more likely we are to contribute something at least to the solution of our more general problem. Inasmuch, however, as we are still largely concerned with disease in man, we shall need some clinical background, though not so much as the clinical pathologist requires. But, if our requirements decrease in terms of clinical experience, they increase in terms of the basic sciences. More and more is it becoming necessary for the research worker in pathology or bacteriology to possess a sound working knowledge of organic and physical chemistry. Without it, his activities will be very seriously limited.

Academic Medical Work

And now we pass to those laboratory workers whose spheres of activity lie in universities or research institutes, instead of in hospitals. They form a continuous series that defies arbitrary division or classification. They range from university departments of pathology, through the departments of physiology, of psychology, of pharmacology, of biochemistry, of biology, of chemistry, of physics, of mathematical statistics, and so on, their immediate relation to disease growing more and more remote, and the number of their workers who are in any way concerned with medical problems growing proportionately fewer and fewer. But remoteness from the centre does not necessarily denote inactivity or unimportance. Sometimes it coincides with a locus of particularly active growth. It does not seem to me unlikely that many of the major advances in medicine will come in the future from branches of science that have no immediate connection with the prevention or cure of disease. It is a fairly safe guess, because that is the way in which all applied sciences have advanced; and medicine has at least one example it can never forget—the work and life of Louis Pasteur.

It should, I think, be emphasised that there is a significant change in the method of approach as we pass from clinical medicine, through pathology, physiology, and biochemistry to the remoter ancillary sciences—ancillary so far as medicine is concerned. The clinician's problems are inexorably posed for him. He has considerable freedom of selection among them, but he cannot often adapt his problem to his technique, he must try to develop his technique to cope with his problem, and even when this technique is very imperfect he must do the best he can with it. The pathologist again has many of his problems set for him, but his choice among them is freer. There is less urgency in his work. He can neglect altogether those problems that seem to him to offer no hope of solution. He can make free use of animal experiment — indeed, pathology is following physiology in becoming more and more an experimental science—and he can isolate his data and phenomena far more than the clinician can, concentrating, if he chooses, on the study of one particular factor among the many that are involved in any of the manifestations of disease.

When we pass from pathology to physiology —if, in truth, we do pass any frontier beyond a convenient difference in academic labelling— we meet with a further decrease in the part played by the observation of phenomena as nature presents them to us, and a corresponding increase in the part played by controlled experiment. With this change there comes an added freedom to select problems in relation to available knowledge and technique. I need not enlarge on the enormous advantage of the introduction of new technical methods into physiology, or on the advances that have followed the adaptation of chemical or physical methods in the solution of physiological problems. The point to note is that the physiologist, when considering any problem, is free to think mainly in terms of technique. If he can devise a method of attack that offers reasonable hope of yielding a significant answer, he will be tempted to proceed. If he cannot, he will probably select some other problem, rather than work with unsatisfactory tools. I suppose that my physiological colleagues would agree with me that Claude Bernard's words remain as true to-day as they were when written 70 years ago:—

"The prudent and reasonable course at the present moment is to explain all that part of disease which can be explained by physiology, and to leave that part which we cannot so explain to be explained by the future progress of biological science."

Claude Bernard, it may be noted, steadfastly refused to recognise any division between physiology and pathology, beyond that incidental to an arbitrary system of labelling, and I think I may best express his outlook on the relation of experimental science to clinical medicine by a further quotation, which occurs in the same passage of the same book.

"But if, instead of this, some delusive approach of physiology gives rise to the ambition to explain prematurely at one step the whole of the disease, then one loses sight of the patient, one gets a wrong idea of the disease, and, by a false application of physiology, experimental medicine is hindered instead of being assisted in its progress."

That, also, is as true to-day as it ever was.

Is it necessary for the physiologist, or the experimental pathologist, to have any detailed acquaintance with practical clinical medicine? For the moment I would merely note that the necessity is clearly much less than in the case of the clinical pathologist or the morbid anatomist. When we come to the biochemist, the experimental biologist, the chemist without the bio-, and the physicist, we are on rather different ground. In none of these instances is there any reason beyond inclination for the research worker to concern himself with medical problems in any shape or form. If he does so, it will be, or should be, because the knowledge and technique at his disposal are of a kind that are ripe for application to some problem of scientific medicine in its broadest sense. One implication is, I think, obvious. In all these fields the value of a man's contributions to medical research will depend mainly on his ability as a chemist or a physicist. How much medicine must he know, or how much biology? It will be more convenient to consider that question a little later.

I have not, I am sure, exhausted the field of medical research in these brief glances at different parts of it. I have not, for instance, discussed the important subject of psychology, nor the study of the diseases of herds that is the domain of the epidemiologist. But it will, I think, be apparent that the territory covered is of very wide extent; and we should, I take it, all agree that any wise policy that takes the long view must aim at keeping the whole of it healthy, and active, and co-ordinated.

The Modern Team

This brings us naturally to the question of team-work; and successful team-work is, I believe, the only method that will enable us to advance rapidly and surely. The range of knowledge required for the solution of most of the problems that face us is, I think, beyond the command of any one man, or of any group of men trained in the same technique. The teams will vary in their character and composition according to the particular field in which they are working. At one end of the scale the clinically trained members of the team will be the dominant partners, doing most of the work and seeking help from their non-clinical colleagues. At the other end of the scale there will be teams with no clinically trained members at all. In between there will be every kind of gradation according to the knowledge and technique that each problem demands.

I do not want to give an impression that, in regard to this question of team-work, I am merely painting a picture of what may be in years to come. I am giving a picture of things as they are to-day. In seeking illustrations it is easier for me to take them from the ground I know best—the middle ground where pathology and the basic sciences are both involved, but clinical medicine does not come prominently into the picture.

The two great institutes of medical research in this country—research as apart from teaching—are the National Institute for Medical Research at Hampstead, and the Lister Institute of Preventive Medicine at Chelsea. If you look at the reports of these institutes for the year 1934, and glance through the degrees and qualifications of the scientific staff and workers, you will note the following figures.

At the National Institute for Medical Research there were 36 workers: of these 13 had a medical degree or diploma, three had a veterinary diploma, and 20 had a science degree but no medical qualification.

At the Lister Institute there were 27 workers: of these, eleven had a medical degree, while 16 had not.

Taking them together there were 24 medicals as compared with 39 non-medicals.

The non-medical workers were, in fact, about half as many again as those with a medical qualification. And it should be noted that the non-medicals—mainly chemists and biochemists, with some biologists and a few physicists—were not in any subordinate position, assisting those who happened to be medically qualified with the problems on which the latter were engaged. They included, and include, heads of divisions and departments; and they number among them some of the most distinguished scientific workers in our common field. That is the sort of world into which those of you who decide to devote yourselves to medical research on its non-clinical side, are going; though in university departments, where the teaching of medical students is combined with research, you will still find a considerable predominance of medically qualified workers.

I have extolled the virtues of team-work; and I have given you my reasons for believing that, for most of us, there is no alternative. But no human system is all virtue and no vice, and teams have their dangers as well as their advantages. The teams I believe in myself are loose, elastic things, easily and naturally modified as need arises, not rigid and ordered, with a set hierarchy of workers. Most members of a team should, I think, be tackling particular problems of their own, as well as those on which the team is engaged, though there may well be a call for whole-time work over a relatively limited period. In any case, I am very sure of one thing, that successful team-work depends on mutual understanding; and mutual understanding, like most things worth having, demands some effort. In this case the understanding that is most required is an understanding of other peoples' technique, including in that term the way their minds work as well as the methods they employ. I do not mean,

of course, a knowledge of their methods that would enable one to do their work oneself, but a sufficient acquaintance with the technical processes they employ, and the kind of things they do with them, to enable one to see a problem, if only dimly, through their eyes. To this kindergarten kind of knowledge over the general field there should, I think, be added a deeper knowledge of some limited part of it that lies adjacent to one's own special sphere of activity. We must, I fear, be specialists, but the more overlapping we can manage the better for us all.

A relatively detailed knowledge of some subject ancillary to one's own can be obtained only as a part of a planned educational syllabus; but the more general knowledge can most easily and pleasantly be grafted on a rudimentary training in the basic sciences by personal contacts and informal talk and discussion. These arise naturally among the workers in any research institute, or university department; but they come more easily, and tend to be much more fruitful, if the habit is acquired early in life. You will be missing a great part of what a university has to give if you do not take every available opportunity of discussing scientific problems with your non-medical fellows, whether, at the start, you know anything about those problems or not.

What Kind of Curriculum?

And now we may turn to the strictly educational side of our subject, and inquire what kind of curriculum is needed to fit a man to work in the wide and varied fie'd that we have been describing.

The Time Limits of Capacity for Learning

Here, again, I must start my argument by raising a question that I am ill-equipped to answer. I gather, from the reports of this year's meeting of the British Association at Norwich, that the capacity for learning does not cease as soon as we had supposed, and that even for the fifty-or-thereabouts there is some hope left. But I gather also that the tests applied were largely memory tests, and the learning of languages. So far as scientific knowledge is concerned, I am inclined to think that, for most of us at least, there is little hope of acquiring facility in a new branch of science after the later twenties. I do not mean that one could not do it if it were possible to drop all other work and devote oneself wholly, for several consecutive years, to learning the new technique, and the facts and arguments derived from it. My feeling is that real knowledge of a science is so much the result of an integration of thought and action that the subject has to be lived with for several years at least before the necessary background can be attained and the new habits of thought acquired. I doubt, for instance, whether any ordinary man can gain a working knowledge of chemistry, or physics, in his spare time, after he has completed his formal education. I know, at least, that my own attempts to gain such knowledge have been ignominous failures.

If I am right in this, and if we accept the not-illiberal view that the average man cannot devote more than six years or so to his whole-time education, counting from the commencement of his university career, then we have those six years to allocate and no more. The research worker will, of course, go on learning all his life, indeed, his learning in this sense will hardly have commenced by the time that his six years are over; but he will be building on foundations that have been fixed during his student years, and he will not usually be able to acquire new, or different, ones.

It is, then, quite useless to plan our curriculum for the medical research worker as though his mind were a limitless receptacle, into which one could pour a large volume of a standard mixture of educational ingredients, leaving room for the addition of more detailed and specialised knowledge of the basic sciences, as and when required. By the time his six years are over he will be an embryo clinician, or physiologist, or chemist, or physicist, or so on. He will be one of these things, not all of them. He may, it is true, have developed along a line that winds across one of these arbitrary frontiers; but if, for instance, he has grafted a general knowledge of physiology on to a basic foundation of chemistry, the lines of his future development will be no less clearly marked.

The Merits and Demerits of Vocational Medical Training

Now it is surely clear that the medical curriculum, as we know it to-day, cannot possibly cope with the educational problem that presents itself. It was never meant to. It was designed, and rightly designed, as a vocational training for men and women who desire to practise medicine, to undertake certain duties to the individual and to the State, and to enjoy the privileges conferred by a registrable qualification. To obtain this qualification, by all but a very few of the available avenues, takes practically the whole of the six years that we have allowed for whole-time study. Let us take the thing as it stands, and see how it meets, or fails to meet, the requirements of the different classes of research workers that we have referred to.

For the Clinical Investigator

As regards the clinical investigator I have little to say, because I do not know. I should guess, as I have said, that he will gain very greatly by having carried some preclinical scientific subject well beyond the stage prescribed by the ordinary medical curriculum.

He will gain in two ways. He will have acquired a knowledge and technique that he can develop and apply in later years, and, what is probably more important, he will have studied some subject sufficiently deeply to have approached the critical stage, and to have gained some insight into scientific method. He will thus attack his clinical studies with a certain ingrained scepticism, a habit, more or less developed, of sifting evidence, that will enable him to make better use of his years in the wards.

Is this all that is required? I should not venture on an answer; but I may quote from the address by Sir Thomas Lewis to which I have already referred. He says:—

". . . there is room for a university degree in medical science, which should not include medicine, surgery, or other branch of medical practice as such, but should centre upon disease, as this is studied in human beings; and this degree should be intended to mark those contemplating an academic career."

He is speaking here of a degree in scientific clinical medicine grafted on a modified curriculum that has led to a registrable qualification; and, clearly, a licence to practise is essential for the man who wants to become a clinical investigator. I would ask you, however, to remember his suggestion, which seems to me an eminently wise one, in view of a possible extension of it which I propose to discuss later.

For the Pathologist and Bacteriologist

In regard to the pathologist or the bacteriologist, it is, as I have already said, my firm conviction that he will be at a serious disadvantage if he has not obtained a firm grip on some experimental science before he studies clinical medicine. I suffer from that disadvantage myself and I know what it means. It may be urged that a man does not, in fact, make up his mind that he wants to become a pathologist until he has completed, or almost completed, his medical education. But I fear that in the majority of cases he will then have made up his mind too late, unless he is prepared to spend a year or two learning what he could have learned more easily at an earlier stage in his career. Is it essential that every pathologist in the future should hold a medical qualification? Is it really necessary that he should devote three years out of his precious six to attaining those multitudinous items of knowledge and technique that the General Medical Council and the various licensing bodies demand from those who are going to treat sick men and women? At present there is no escape; and it will, I should guess, always be wise for those who propose to study pathology in close contact with the ward to go through the same educational mill as their clinical colleagues. For the rest of us, whose work lies wholly or almost wholly in the laboratory, I am not so sure. It is true that one tends to undervalue what one has and to yearn for the unobtainable, but I know that I personally would gladly sacrifice much that I remember vaguely from my hospital days for a working knowledge of chemistry.

I believe that the best solution would probably be for some academic pathologists to take a full medical curriculum, while others followed the routes that I am going to suggest as possible alternatives. The research worker is seldom isolated—it is never healthy that he should be—and among groups working in research institutes or university departments it would be all to the good that, even among those who are all labelled pathologists, different workers should have a rather different background. But there must be no differentiation in regard to status or opportunity. By whatever road a man travels all posts, including the highest, must be open to him. At the present time the man who enters the pathological or bacteriological field, even on its academic side, without a medical qualification will find many posts closed to him; and this is a risk that few can afford to take.

For the Physiologist and Biochemist

As for the physiologist, those whom I have known were marked as physiologists before they approached a hospital ward, and were quite deliberately taking a medical degree as a preliminary to returning to the work of their choice. We know from example that three years in the wards, with a medical qualification at the end of it, is not an essential preliminary to the highest achievement in the physiological field. Is it, on the average, an advantage? I cannot tell. But I am sure that such advantage as there is could be purchased much more cheaply; and an educational waste in one's active learning years is not to be regarded lightly.

The biochemist, in so far as he is concerned with medical problems, I should class with the physiologist, and here again I would note that some of those whose work has contributed most notably to medical science possess no medical degree.

For the Chemist and Physicist

And the others, the chemists without the bio-, the physicists and so on. No one would seriously suggest that they should be forced to take a medical qualification. Their training in their own subjects will take them four years or more before they reach a standard that will enable them to make use of their knowledge in the field of medical research. How are we to provide for them? For many, of course, no provision is required. They will pursue their own careers, lending occasional assistance in our problems when these have reached a stage at which they have become purely chemical, or physical, as the case may be. Medical science

can never make provision within its own borders for all its needs. We shall always be asking for help from our senior colleagues in related branches of science. But it is quite clearly desirable that some of those who have mastered the technique and conceptions of one or other of the basic sciences should definitely enter the medical field and make a career for themselves within it. The men we want will not, and I do not think they should, enter this field in any position of permanent dependence on their medical colleagues; but if they have no knowledge of physiology and pathology they can hardly escape that position. Moreover, I do not myself believe that, without that knowledge, they will be in a position to grasp the fundamentals of the problems which their basic training would enable them to attack.

A Short Training in Medicine for the Scientist

Is it altogether premature and absurd to suggest that there is a real need of a training in medicine that will not lead to a licence to practise, nor to a position as a clinical investigator, but will give a student who is already equipped with a sound foundation in one or other of the basic sciences on which medicine is built sufficient knowledge of disease as it occurs in man to enable him to turn his special knowledge to account in the medical field? The training in the wards would, of course, have to be preceded by an adequate training in anatomy, physiology, and pathology—adequate that is for this particular purpose. But is it really sensible to deny to those whose help we badly need any insight into clinical problems, except on the condition that they work through a long and overcrowded curriculum, and jump a number of examinational fences that were designed for a quite different purpose?

The Ordinary Medical Student

I have in this address said nothing of the man whose future lies in general or consulting practice, or in the administrative field of public health. He falls, I think, into another category. The choice has to be made. You can be a research worker or you can be a practitioner. I do not believe that you can be both. Medical science, if you wish to serve her, demands all your time and energies; so does medical practice. The choice will depend, if you are wise, mainly on your mental reactions, so far as you yourself can judge them. If you let other considerations weigh with you, you will risk all the discomforts of a square peg in a round hole. There are of course no hard-and-fast categories. Some men can be happy and successful either way; but some, I think, cannot. There are minds that have a natural liking for search-out unsolved problems and following them through to a finish, or as near to a finish as they can. The problems must be sought or selected, not forcibly presented; and the time and energy required for their solution must not be too greatly encroached on by a host of unrelated activities. Such minds will be profoundly unhappy if placed in an environment in which this unhurried continuous pursuit of some chosen problem is impossible. Medical practice is no place for them. There are other minds that work best under the stimulus provided by some insistent practical need, and that have the capacity of facing a multitude of problems at one and the same time, and enjoying the rush and turmoil of it all. Such minds often suffer boredom if forced to concentrate for long on a question that has no obvious practical issue. Given the requisite skill and sympathy, they will do well in practice; but in the research laboratory they may find themselves on foreign soil. There is no better or worse in it, no higher or lower. It is a question of temperament. No one with any sense of values would attempt to balance the care of the sick against the discovery of new facts about disease. Both are things worth doing, and both need doing well, and with one's whole mind.

I do not mean, of course, that no advance in medical knowledge comes from practising physicians or surgeons; that would be merely absurd. Their contributions have been many and important; but any investigations that they undertake are incidental to their main work, and are therefore determined and limited by it. They have neither the time nor the opportunity to tackle problems of the type we have been considering.

The practitioner's daily work, however, presents him with endless opportunities for observation and for the accumulation of data that can be obtained by no one else. If his observations are properly made, and properly recorded, they may well be of great value, to others as well as to himself. There is, I think, a dangerous fallacy hidden in the conventional division between medical science and medical art. They may be regarded as antitheses. This is entirely false. Some part of medicine is "scientific," in the sense that we are able to apply clear and definite physiological or pathological knowledge in the diagnosis, prevention, or cure of disease. This field is rapidly enlarging, and each enlargement means a corresponding increase in the efficiency of our work. A large part of medicine would, at the moment, fall into the category of "art," in the sense that we have as yet no "scientific" knowledge to apply. But the man who neglected his art whenever scientific knowledge was available would be a very poor practitioner, and the man who does the best he can when facing a practical problem in the light of half-knowledge, or with no "scientific" knowledge at all, relying on his own experience and his own observations so far as they will take him,

is a perfectly good scientist. The thing that matters is that he should realise clearly what he is doing. He must use science, when science can help him; and to use it he must have a working knowledge of it. Above all, he must avoid pseudo-science like the plague; and that is not always easy. The scientific outlook, in this, which is its true sense, is just as important in practice as in research.

The Curriculum Leading to Medical Practice

I emphasised at the beginning of this address that I was discussing the medical curriculum as it affects the future research worker. In closing, I should like to make it equally clear that I am not suggesting that this is the angle from which the problem of future changes in that curriculum should be approached. It would be absurd, in considering any possible reforms, to allow the interests of that small band of men and women who intend to devote themselves to the academic side of medicine to weigh against the interests of the great mass of students whose future lies in practice, or in the administrative field of public health. All that I have done is to stress the importance, to the future research worker, of making full use of the preclinical years, and to suggest a possible avenue by which we might bring into the medical field research workers in other branches of science, whose entry as full partners is rendered difficult or impossible by our present system. If I were tempted to offer any suggestion as to the reform of the medical curriculum as a whole it would be that it needs a greater elasticity and some degree, at least, of differentiation. Apart altogether from the special needs of medical research, I do not myself see how a single rigid curriculum can possibly provide for the training of all those practitioners, specialists, semi-specialists, and medical administrators on whose activities the prevention and treatment of disease depends. There is, of course, a rapidly growing system of post-graduate diplomas and degrees that serve to train men and women for specialised medical activities, and these will certainly become more and more important in the future; but there must be some limit to the total curriculum. If something could be done to lighten the general burden, to reduce the number of facts and the range of technical knowledge that have to be mastered by every medical student, so that he had a little time in which to think, it would, I believe, be a very great advantage to the profession as a whole. I have already referred to the suggestion of Sir Thomas Lewis that a modified and shortened medical curriculum might be followed, for those who wish to become clinical investigators, by a special course in scientific medicine. Could not this process of simplification and elimination during the earlier clinical years, with differentiation during the last year or so, be considerably extended, to the advantage of all concerned? But such questions as these lead inevitably to a consideration not only of medical education but of the whole organisation of medical practice, and I have neither the time nor the courage—perhaps I should say the bravado—to enter on so thorny a field of debate.

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VETERINARY APPOINTMENTS

FEW realise the value to the profession of the work done by the Appointments Committee of the "National" during the last few years, for while all hear of the one or two appointments that have been filled by individuals accepting conditions which the "National" regarded as unsatisfactory, few learn of the many changes that have been made in the proposed conditions attaching to appointments under consideration, changes which have followed upon representations made by the Association. Many of the younger men in the profession who take up salaried posts in the State or local government services or in research are aware that their initial salaries are much higher than those held years ago by their older colleagues and they show that they appreciate the fact that this increase has been achieved to some considerable extent by the labours of the "National" by seeking its membership early. The number, however, who seemingly forget this circumstance, and who delay their application for membership of the Association is nevertheless surprising and demonstrates again how easy it is for some to forget what they owe to others. But further progress is still desired and to this end it is now the agreed policy of the Appointments Committee to work amicably with all bodies employing veterinary surgeons whenever this is possible. To this end it is always ready and willing to arrange meetings with or send deputations to these bodies to discuss conditions associated with veterinary appointments. As a result of such meetings more sympathy and understanding has been developed between the profession and the employing bodies, with the result that in many instances the conditions of employment have been greatly improved. For example, the salaries of veterinary officers of certain counties have been raised after receiving communications from the "National"; others have done so after receiving a delegation, whilst yet many

others must have been influenced by the meeting arranged between certain members of the Appointments Committee and the County Councils Association, at which meeting the whole question of veterinary appointments by these bodies was thoroughly discussed. Other counties, again, that have employed two junior veterinary officers of equal standing have been persuaded in the interest of efficiency to create a chief veterinary officer. Of the one or two counties that have appointed men under conditions unsatisfactory to the profession, one of these has recently appointed a new man under conditions agreeable to the Association, whilst another has endeavoured "to erase the stigma" associated with its veterinary department by raising the salary of its officer. Unfortunately this latter step can hardly be said to rehabilitate the individual himself in the eyes of his professional brethren, several of whom loyally refrained from applying for the post originally as it was considered that such action was not in the best interests of the profession. The Association must continue, for this reason alone, to express its displeasure with disloyal members and request any such individuals to resign from its membership. In addition, the Council has recently decided that authorities employing such individuals shall not be asked to send delegates to the Annual Congress of the "National."

But, besides county and municipal appointments, the committee has had under consideration the positions of veterinary research workers and of veterinary investigation officers, and a delegation was received recently by the Ministry of Agriculture to discuss the Association's proposals. Although it is too early to be definite, it is believed that many of these proposals will be adopted by the Ministry and that there will be some improvement in the conditions associated with these appointments. At the same time the committee is anxious to watch developments connected with overseas appointments and visits from veterinarians home from abroad are welcome, as is similar information received about appointments at home. For effective action early information is desirable, as once conditions have been made public it is more difficult to get official bodies to revise them. It is for this reason that much of the effective work done by the Appointments Committee of the "National" never receives the publicity which is perhaps its due. The loyalty of its members and the receipt of early information are two of the strongest supports the "National" has in its efforts to continue to improve the status of the profession.

Clinical Communications

RED-WATER MORTALITY

F. T. HARVEY, F.R.C.V.S.
St. Columb.

Applying to Bayer's in October last for a supply of Acaprin, I was informed that, owing to the extraordinary demand for this agent in the preceding weeks, stocks had run out and that there would be some temporary delay. It would thus appear that Acaprin had been extensively used in the treatment of red-water during the autumn and that some information should be available as to its efficacy, in various areas, in that disease.

In the early summer I arranged for a return of the number of red-water carcases dealt with at a small local knackery, but the figures did not arrive in time for the "National" meeting in Belfast. Thirty such were collected during June and July and probably a similar number would have been brought in at another place three miles away, while a few dead animals are usually disposed of in other ways. There is thus a heavy loss to agriculture which might be almost entirely prevented by a rational therapy. In approximately a hundred of the last cases which have been dealt with here, early in the attack and submitted to no promiscuous dosing, all the visited animals having received Acaprin, the urine promptly cleared, the animals were not greatly upset by the illness and lost little weight.

It is common to hear farmers say of such and such an animal "She had the red-water and has not been right since," or "It tore her to pieces." The animal medicine vendors so much in evidence at the present day are a curse to red-water patients, if not others, and they all rope it in for prompt cure by all sorts of mixtures. Thus a widow had given her only cow four of somebody's red drenches and was in a state of panic when she called me in. About the same time I saw a beautiful cow similarly treated and which on the fourth day of the illness had a temperature of 107·5°, respirations 60 and pulse 120. She went under after a great struggle.

Some form of propaganda seems necessary in red-water areas in order that stock-owners may realise the advantages to be gained by rational methods of treatment, since the disease, when dealt with otherwise, is to be regarded as a "killer," and I doubt whether any other had furnished as many carcases to the yards above mentioned, in the same period as this one. I was recently informed by a farmer who buys bulls at the Exeter sales that insurance companies refuse to carry red-water risks on insured animals—rather a reflection on red water therapy.

A study of animal losses is of considerable value and complete "bills of mortality" for the animal world would give us shocks but would advance veterinary medicine very materially. A good example of this form of inquiry appeared in *The Veterinary Journal* for October: "Laying Trials Mortality Records," K. D. Downham.

[The attention of our readers is drawn to the extended reference to the introduction and uses of Acaprin in the treatment of piroplasmosis made by Professor H. Horlein, of Düsseldorf Academy of Medicine, in the course of a lecture given at a meeting of the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine. The report of this lecture appearing in *The British Medical Journal* of October 12th, 1935, was reproduced in our issue of October 26th, 1935 (No. 43. Vol. **15.** pp. 1305-1306).—*Editor.*]

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HERMAPHRODITE HORSE

J. BUCKINGHAM, M.R.C.V.S.
Harleston, Norfolk

Subject.—Six-year-old Shire horse.

History.—This horse was bred by the owner, who thought it was an abnormal female until it was about five years old. It had the appearance of a mare except that the clitoris was much larger than normal and resembled a miniature penis—being about two-and-a-half inches long. There was evidently a urethra in this organ, as urine passed through it. The animal behaved normally until it was about five years old, when it became vicious—striking out with its fore-feet. It used to try and cover mares in season.

Examination.—This revealed the partially developed penis in the place of a clitoris as described above. There was a normally placed mammary gland with two teats. The off "testicle" could be felt beside the mammary gland. The near testicle was found in the inguinal canal after the animal was cast.

Operation.—The animal was cast and chloroformed. An incision was made on the left side of the mammary gland and the near testicle was discovered in the inguinal canal. Removal was effected with an écraseur. No difficulty was experienced in locating the off testicle, which could be felt before the animal was cast. This also was removed with the écraseur.

These organs were about three-quarters the size of a testicle of a normal six-year-old stallion, and appeared to be composed of both ovarian and testicular tissue.

The animal made an uneventful recovery and behaved as a normal gelding afterwards.

Remarks.—During 38 years of practice, including the castration of many cryptorchids, the writer has met with only two other hermaphrodite horses—although he has seen hermaphrodites in practically all other species of domesticated animals, especially pigs.

Both of the other horses were hackneys and when they micturated the urine was expelled in an upward direction. This was not the case with the Shire horse. The hackneys were operated on at two and three years old respectively.

Abstracts

[Undulant Fever, with special reference to its Clinical Aspects in England and Wales. Dalrymple-Champneys, Sir Weldon. *Lancet.* Dec. 28th, 1935. p. 1449.]

In this paper the author, who has had unrivalled experience of undulant fever in this country, discusses the clinical aspects of a series of cases of the disease in England and Wales which have come to his notice in recent years. Of the 255 patients in this series whose sex was known, 170 were males and only 85 females, this preponderance of males over females having been observed in nearly every country in which the disease has been studied. Of the 250 patients in the series whose ages were known, 107 (*i.e.*, 43 per cent.) were between 30 and 40 and only nine were under ten years of age. The author describes the usual course of the disease and comments upon the conspicuous disproportion in many cases between the height of the temperature and the degree of prostration of the patients, who are often found to be pursuing their usual avocations with temperatures of 103° to 105°F., and after many weeks of high fever, such as would produce profound prostration in such a disease as enteric fever, are comparatively fit and may make a rapid recovery. He then discusses the symptomatology of the disease, giving a diagram to show the commonest signs and symptoms in 300 cases, the principal in order of frequency being sweating (often profuse and sometimes sour-smelling), malaise and fatigue, headache, anorexia, pain in the back or limbs and constipation. The temperature charts are very variable, but generally display the daily swings usually associated with septicæmias, and in most cases at some stage the characteristic waves from which the disease derives its name. The three main types of temperature chart (of which examples are shown) are the undulant, the remittant and the irregular. The average duration of fever in this series of cases was 11·5 weeks (minimum one week, maximum 104 weeks, excluding one exceptional case). Eighteen different complications are instanced

but true sequelæ were uncommon, persistent weakness and neuralgia being the most frequent.

The author then discusses the diagnosis of the disease and urges that "it is wrong to regard a diagnosis of undulant fever as a last desperate resort when every other cause of fever has been excluded." He points out that "seeing that the agglutination test, properly carried out, will give a definite answer in nearly all cases after the fifth day of the fever, blood specimens should be sent for this test at once in all cases in which the clinical picture creates a suspicion of undulant fever" and the pathologist should always be asked to put up the blood against a Brucella suspension when blood is sent for agglutination against the enteric group. The average agglutination titre for 255 cases in the author's series was just under 1 in 1,500. The limitations of the agglutination test due to delay in the appearance of agglutinins, the occurrence of pro-zones and para-zones, of non-agglutination and the occasional complete absence of agglutinins in cases with a typical history and clinical picture are then discussed. The intradermal test with "abortin" or "brucellin," which is described, is regarded by the author as a useful adjuvant to diagnosis. Blood culture was attempted in only 77 cases of the series and was positive in ten cases (13 per cent.). Urine culture was successful in four out of 47 cases. Culture from the fæces was unsuccessful in all the 21 cases in which it was tried.

Blood counts though not diagnostic in themselves are useful, the commonest features in this disease being anæmia (present in 33·3 per cent.) and lymphocytosis (66 per cent.). Discussing the differential diagnosis, the author remarks that in the 91 cases in which an alternative diagnosis was made, enteric fever was diagnosed in 41 cases, influenza in 24, paratyphoid in twelve, pulmonary tuberculosis in six, malaria in four and cholecystitis in three.

As regards prognosis, death occurred only nine times in 290 cases (3·1 per cent.). Approaching recovery is shown by the disappearance of hitherto persistent symptoms, clearing of the tongue, rise in the agglutinin titre and an apyrexial period of more than five days. High fever is not necessarily a very serious sign, but general toxæmia and persistent or severe hæmorrhages are of grave import. Treatment is then considered and the very sparing use of antipyretics is recommended. Vaccines gave very variable results, the best results being obtained with typhoid-paratyphoid vaccine (T.A.B.), nine out of 13 cases having definitely benefited from such treatment. Finally, the more extended trial in this country of abortin or brucellin (the filtrate of a three weeks' culture of the causative organism) is urged.

[Bang's Disease Control in State Institution Herds. III and IV.—Progress Reports on the 15 Herds for 1931 and 1932. Fritz, B. S., and Barnes, M. F. (1935.) *J. Amer. Vet. Med. Ass.* **87.** 5. 543-558.]

This report is a complete breeding record of 16 herds over a period of two years and is a continuation of previous reports (*J.A.V.M.A.*, **76**, 490; **83**, 680). All herds had been already freed from contagious bovine abortion. One became reinfected in 1931 and records of blood tests and subsequent histories of all reactors in this herd are given in full. The authors consider all titres below 1 : 100 suspicious only; however, their results show the importance of agglutination in the lowest dilution (in this case, 1 : 25), especially in the case of a newly-infected or reinfected herd.

In 1931, the percentage of abortions in 812 cows, not due to *Br. abortus*, was 2·78; in 1932, in 948 cows it was 2·3, despite two herd percentages of 12·3 and 11·3. The cause was not determined in all cases but was shown not to be bovine contagious abortion (*Br. abortus*) by blood and other tests. In one herd, *Vibrio fœtus* was demonstrated in the aborted fœtuses. In certain other cases, streptococci were found and, in one instance, pure cultures of a mould were obtained from the fœtal stomach and organs.

The authors emphasise the important relationship between herd management and breeding efficiency. The time of the first œstral period after calving has a considerable normal range, and, if only for this reason, the animal should have more than casual observation. In 1931, in these 16 herds the average interval between calvings, *i.e.*, for all cows and served heifers, was 11·9 months and an average of 1·3 services was required. In 1932, the corresponding interval was 12·1 months, whilst the services required averaged 1·6.

A. W. T.

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[Note on the Subject of Johne's Disease in Sheep. (Trans. title.) Thiery and Getas. (1935.) *Bull. Acad. vét. France.* **8.** 4. 210-212.]

A survey is given of records of occasional outbreaks of Johne's disease in sheep in various countries since 1911. Only recently have cases of this disease been detected in France and in 1935 three flocks were found to be affected and the outbreak on one of these farms was investigated. Johne's disease in cattle exists on this farm and recently, when ten ewes died out of a flock of 400, Johne's disease was diagnosed as a result of two *post-mortem* examinations. The symptoms are not strikingly different from those in cattle—lack of appetite, scouring and progressive emaciation being noted. As amongst bovines, cases generally become apparent during

the month following parturition and insufficiency of minerals may be involved.

The johnin test was employed in an attempt to determine the number of reactors and, out of 107 tested, 23 gave positive reactions, 15 doubtful reactions and 69 negative reactions. In a further lot of 60 tested 22 gave positive reactions, three were doubtful and 35 gave negative reactions. With such a high proportion of reactors one can imagine that under certain conditions Johne's disease might be as serious in sheep as in cattle.

W. L. S.

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[Anaplasmosis of Sheep in the Nièvre Department. (Trans. title.) Carré, M. H., and Avignon, M. (1935.) *Rev. gén. Méd. vét.* **44.** 519. 129-139.]

In October, 1934, an outbreak of disease occurred in a flock of young sheep made up of odd lots bought a fortnight earlier. It affected only those coming from a limited area in the Nièvre Department, and ultimately 23 died.

The symptoms were irregular breathing and dry râles, the animal rapidly getting very weak. The mucous membrane of the eye was pale and slightly icteric. The fæces showed only a small egg count. On *post-mortem* examination there were no signs of septicæmia and the small amount of fat present was slightly icteric. The kidneys, normal as to volume and consistency, were discoloured, being yellowish-grey. The lungs were very slightly hepatised and small numbers of Hæmonchus were found in the fourth stomach. Clinical examination of the blood prior to death showed intense anæmia—only 1·8 million red cells, as opposed to a normal of 12 to 15 millions, being present. Blood preparations, after staining, showed severe anisocytosis and poikilocytosis. There were inclusion bodies in a great number of the corpuscles. The abnormally small corpuscles showed fine peripheral granulations and nearer the centre one, two, three or more anaplasmic bodies of varying diameters. The normal-sized cells had even more granulations, these being intensely coloured either uniformly all over the corpuscle or with a clearer central zone. The abnormally large cells contained round or ovoid inclusion bodies of great size. The differential leucocytic count showed polymorphs 20 per cent. and large mononuclears 80 per cent. The leucocytic formula, the slight worm burden, the definite lesions shown on autopsy, the enlarged spleen, the intense anæmia and finally the marked alterations in the red blood cells indicated piroplasmosis, and in the absence of hæmoglobinuria, anaplasmosis. Confirmation was obtained by transmission of the disease to healthy sheep following inoculation with 20 c.cs. of defibrinated blood from affected animals.

It is thought that the disease may have been introduced by contact with African sheep, since horses and dogs in the neighbourhood were found to be carrying Dermacentor and not Ixodes, the vector transmitting *Anaplasma ovis*.

W. L. S.

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[The Sheep Nasal Fly. A Method of Treatment for Sheep Infected with the Larvæ of Œstrus ovis. Du Toit, R., and Clark, R. (1935.) *J. S. Afric. Vet. Med. Ass.* **6.** 1. 25.]

In certain parts of South Africa, notably the Transvaal highlands and the Orange Free State, nasal bots in sheep cause serious losses, and there is need for practical measures for control. The authors carried out *in vitro* experiments to test the value of certain drugs in killing bots, and both carbon bisulphide and ethylene tetrachloride were found to exert a lethal effect in one minute. A mixture of equal parts of the bisulphide and liquid paraffin gave practically the same results, and this was used in field tests.

To simplify treatment the authors devised a trocar and canula with a piercing point which may be tapped quite easily into the frontal sinus. Two cubic centimetres of the above mixture is then injected into each frontal sinus. In the horned breeds the best site for injection is just below the bases of the horns. In hornless breeds of sheep the site chosen was slightly to each side of the median plane of the skull, and on a line just above the centres of the bony orbits. The guarded trocar is held in the left hand and struck home sharply with a mallet.

The immediate effects of the injections are frequently alarming, and the sheep may show intoxication and incoördination of movements. These, however, pass off quickly and recovery is complete in half-an-hour. An appendix shows the results of treating a number of affected sheep, from which the authors conclude that the method is safe and efficacious, but is not to be recommended for sheep under the age of six months.

W. L. S.

Repairs to Cowhouses.—Following a conference between the County Veterinary Committee and the local sanitary authorities with regard to the repair of cowhouses on small holdings for the purposes of the Accredited Producers' scheme, the Montgomeryshire Agricultural Committee have resolved that repairs necessary to qualify for a licence should be carried out for tenants, but that, in cases approved in the future, interest be charged on the cost of structural or main alterations to improve buildings for this purpose.

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The Heaviest Bullock?—A bullock weighing 2,865 lb.—roughly a ton and a quarter—has been killed at Reichenhall, Bavaria (says Reuter). The average weight of a marketable fat bullock in Britain is about half that weight.

"VETERINARY MILITARY HISTORY OF THE UNITED STATES"

(*By* LOUIS A. MERILLAT, Lieut.-Colonel Veterinary Reserve, Chief Veterinarian, First Army, American Expeditionary Force; and DELVIN M. CAMPBELL, Lieut. - Colonel, Veterinary Reserve, Editor, *Veterinary Medicine*)

[Reviewed by Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S.]

This book is the outgrowth of a series of articles published in 1932 on "The Veterinary Service of the American Expeditionary Forces" on the Western Front in the World War. With these data as the inspiration, it was decided to expand the manuscript so as to include the entire history of the military-veterinary service of the United States from the Revolutionary War to the present time, and to include a list of World War veterinary officers, their rank, promotions and assignments, and finally, of all who have served in the Army since 1879 when, by Act of Congress, graduation from a recognised veterinary college was made a prerequisite to such service. The authors are to be congratulated on the herculean task which they have undertaken, and on the success which has attended their efforts.

Volume I contains an Introduction and VI Books; Volume II contains III Books. Each Book is divided into Chapters, numbering altogether LXI.

Chapter I.—The Era of Veterinary Medicine

Veterinary historians are not in accord as to who should be called the "Father of Veterinary Medicine." Some would have Hippocrates (470-361 B.C.) given the distinction. Others would have it that Galen (A.D. 130-201) philosopher and physician, who insisted that animals used for food, especially for the sick, be inspected as to their health, should receive more favourable consideration. Apsyrtus flourished as a veterinary teacher and author during the middle of the fourth century A.D. at Constantinople. He was an army officer, charged with the veterinary service of a large cavalry force maintained by Constantine, and it is not amiss to agree with General Smith that he "was the father of the veterinary art of the present day." To many, however, Vegetius (A.D. 450-500) is the "Father of Veterinary Medicine." These authors laid the foundation of the present veterinary art. After Vegetius and his colleagues and their immediate successors, the progress of veterinary medicine stopped. Their literature was confiscated. Rome had been invaded by the Barbarians and the Church forbad the dissection of animals and the holding of autopsies. In the Second or Arab Period, which extends from Vegetius to the Renaissance or from the seventh to the twelfth century, the Arab period of veterinary history is significant. The development of veterinary medicine by the Arabs when confronted with the problem of governing a vast territory and a large population, was an exemplification of the fact that whosoever establishes a nation must develop a veterinary service to save its animal industry. The veterinary practice of the Occidentals under the blacksmith was neither hippiatry nor veterinary medicine. To what extent the chaos and duration of the Middle Ages was due to the neglect of veterinary medicine can be left to those who understand the complexities of animal production and its relation to orderly society. The veterinarian's theory is that neglected diseases of flocks and herds, and the equine diseases of field armies and their lethal drain on public resources, was a dominant factor. In the Third or Present Period of transition from medieval to modern times veterinary literature was reconstructed out of the chaos of the preceding centuries. The gradual elimination of superstition and fear from the therapeutics of the time led to the reincarnation of veterinary literature and later the founding of veterinary schools in all the principal countries of the world. The habit of making veterinary medicine complemental to horsemanship or to agriculture came to the United States from England. Sollysel published the first complete veterinary classic of this period in 1664. He pointed out the lamentable state of the veterinary art created by allowing it to fall so completely into the hands of the farriery, which was especially apparent in Paris at that time. The first veterinary school in France was founded by Claude Bourgelat and opened at Lyons on January 1st, 1762. His appointment was made by Henri Leonard Bertin, Comptroller of finances under Louis XV. In March, 1764, Bertin called Bourgelat to Paris to found the school now known as l'Ecole Vétérinaire Nationale d'Alfort. The credit of founding the first veterinary school in England under the title of the "Veterinary College of London" is due to Charles Vial de Saint-Bel, who was a graduate of Lyons. This was in April, 1791, but he did not live long enough to see the fruits of his enterprise, dying on August 21st, 1793, after seventeen days' illness from glanders.

Dealing with matters incidental to war policy, the second chapter states: "We have always gone to war unprepared, not only in the arms, but more particularly in the fundamental necessities a competent veterinary service supplies. The failings in this respect are now apparent in the shortness of veterinarians required to carry out the various civil govern-

mental projects, Veterinary Corps Reserve activities and individual service for the farmers. A general mobilisation would find the veterinary profession, as constituted at present (1935) as insufficient and unprepared as it has been in former times. 'We—The Unready' is a graphic caption for a discourse on the veterinary profession of this country at this hour."

The remaining chapters are dealt with by the presentation of excerpts or of summaries.

Chapter III.—Livestock Industry—Its Relation to National Defence

At the end of the first decade of the twentieth century there were in round numbers 27,000,000 horses and mules; 25,000,000 dairy cattle; 30,000,000 beef cattle; 50,000,000 hogs; and 70,000,000 sheep in the United States. For general purposes these figures may be applied to the present time by reducing the figures for horses and mules by 10,000,000.

Domestic Animals in the United States in 1934.—Horses and colts 11,942,000; mules and colts 4,931,000; beef cattle and calves 67,352,000; cows and heifers 26,062,000; sheep and lambs 51,374,000; hogs and pigs 55,976,000; chickens 673,092,000; dogs (estimate) 15,000,000.

During 1934, through the official regulation of production and other factors the number of hogs was reduced to approximately 37,000,000, and owing to a widespread drought in the range-cattle regions, the number of beef cattle was diminished 7,300,000. The numbers of animals slaughtered under Federal veterinary inspection in 1933 were cattle and calves 13,561,891; sheep and lambs 17,353,550; hogs 47,225,518; horses 42,304; goats 6,397.

Animal Situation Important in National Defence.—While there are 17,000,000 horses and mules in the United States at this moment, for example, the possibility of supplying a large army with suitable animals in the numbers set down on the present Tables of Organisation is problematical. There has been no time in American history when the conservation of military animals was more important than now, because at no time has the available surplus been more precarious.

Chapter IV.—Horses and Mules

The Greeks, the Romans and the Arabians considered control of the diseases of domesticated animals as inseparable from control of the diseases of man. In this, the fourth decade of the twentieth century, the inevitable unity of human and veterinary medicine is again taking form. The American nation went into the fourth quarter of the nineteenth century before it established a veterinary service for the livestock industry which, from the sixteenth to the twentieth centuries, grew stupendous through the vast territory occupied and the unprecedented increase of population. After the Constitutional Convention of 1787, the Congress created thereby began a plan of national defence. It provided in 1792, for two regiments of dragoons to which farriers were attached to care for the ailments of animals. It was there that the veterinary service of the army was officially born.

The Cradle of Veterinary Quackery.—Educated veterinarians, who in all European countries were already numerous, would have been extremely useful attachés of these home-seeking people. Nowhere in the world was a veterinary service more needed than in the development of the United States before the Civil War. In this era of veterinary quackery of the poorest genre, the nation went into a colossal catastrophe—the Civil War. The United States Veterinary Medical Association was organised (1863), veterinary schools established, and a veterinary profession created.

World War Demonstrates Extravagance.—The American extravagance staggered the Allies, and this was particularly true in regard to wasting precious live animals. The failure to prevent the spread of fatal and disabling diseases in remount depôts, and the indifference of the General Staff to the organisation of a conservation service, such as the British, the French, the Belgians, and the Italians had found so important, were distracting to everyone except our troops, who were yet to know better. In the veterinary service of the World War, we thought of animal heroes as units of transport waiting patiently, but badly attended in the remount depôts, pestered and suffering from preventable causes; herded by thousands, unkempt and underfed, in filthy corrals or standing in the open ill-constructed sheds floored with sticky mud and bottomless because of the ill-chosen location. In all of the wars, big and little, fought by the United States, poor horse management has been the outstanding blot on our military efficiency. The practice of veterinary medicine was too long left to quacks and quack methods and thus our military animals have been subjected to needless cruelty of the first rank, always to the disadvantage of the troops in the field.

Chapter V.—The Cavalry Arm

Without mobility it is futile to maintain cavalry at all. To perpetuate itself cavalry must henceforth conserve its animals as it has never done before. Tanks, tractor-drawn guns, trucks and automobiles mire after the first few have passed over a soft-top lane. Besides, a failing supply of motor fuel would leave a field army at the mercy of a much weaker enemy. We believe that the cavalry arm should be maintained undiminished. These opinions are corroborated by the highest authorities who participated in the great battles of the War.

Chapter VII.—Indifference to Experience

The morbidity from virulent respiratory infections became appalling during the winter of 1917-18 in the United States as well as in France owing to the agglomerating thousands of "green" animals where no provisions for the sanitary handling of them had been provided. There was a veterinary corps in the making, but no veterinary corps centrally controlled under orders, in operation. Everywhere at home and abroad, public animals were exposed to inclement weather, mud-puddled ground, filthy watering troughs, and accumulated droppings. Dry standings, immutable requirements among the British, French and Germans, who had travelled the road of experience, were everywhere lacking in the horse management of the American troops. Lack of understanding, and not of means or money, was the obstacle. Much of this type of trouble in remount depôts and annexes was due to unwise selection of sites. Notwithstanding that the British, French and Italian veterinary services had set an example in the economical and humane handling of animals in war, our officers in charge of such matters had not studied them. The veterinary events of the World War have shown vividly that a competent veterinary corps, planted in the military branch of the government to meet a vital emergency, is not the growth of a week or a month.

In the British Army through a smooth-working system of evacuation and replacement, about 85 per cent. of disabled animals were returned to the service. In money, this means much, but in terms of the service of hard, enduring, well-broken, acclimatised animals it means far more. Animals restored to health in scientifically managed veterinary hospitals are fit and ready, and know their job. On the economical side, the operation of a veterinary service is based on the presumption that it is cheaper to cure a sick animal "taken in time" than to procure a new one of uncertain fitness.

During the World War, the British veterinary service hospitalised 2,526,549 animals, of which approximately 2,000,000 were cured and returned to duty. Without these 2,000,000 animals the world supply would scarcely have been sufficient for the requirements of the British Remount Service alone.

Chapter VIII.—Defective Veterinary Service in the South African War led to Revolutionary Changes

The British Service made revolutionary progress through the instrumentality of reports on the appalling conditions in animals which developed in South Africa because of the lack of adequate veterinary service.

Chapter IX.—Horse Management Problems of the Veterinary Service

The remount service was the worst offender against the dictates of common sense in animal management. According to unimpeachable witnesses, in remount stations in France, horses by the hundreds stood in mud so deep that they could not lie down, and there remained day and night, until they died of exhaustion.

Chapter X.—Early Army Veterinary Service

Up to 1835, no reference is made to an expert veterinary service in the army tables of organisation, nor does it appear that any provisions were made for the care and medical treatment of sick animals. The treatment of animals fell to the horse-shoers, later called farriers, who were charged not only with the shoeing of animals but also with the treatment of the sick and injured. It was through Lieut.-General Philip Henry Sheridan that an adequate veterinary service for the army was established.

Chapter XII.—Veterinary Service of Civilian Population

At the close of 1861 there were veterinary colleges in every important country of Europe, but none in the United States. Treatment was mainly in the hands of the unqualified, whose practices were unthinkably barbarous. These "dark ages" came to an end in 1850 when planting the seeds of veterinary colleges began for the first time. A visitation of contagious pleuro-pneumonia in cattle in 1843 and the public unrest caused thereby, together with other factors, notably Texas fever, glanders and hog cholera, and probably the growing influence of the veterinary profession and the increasing importance of the livestock industry, eventually led to the founding of the U.S. Bureau of Animal Industry by Congress and to its being placed under the directorship of a qualified veterinarian on May 29th, 1884.

Chapter XIII.—Early Veterinary Education and Literature

In 1806, Dr. Benjamin Rush advocated before the Philadelphia Society for the Promotion of Agriculture the establishment of a veterinary department in the Medical School of the University of Pennsylvania. Seventy years later, Huidekoper, a descendant of Doctor Rush, formally inaugurated the school visioned by his ancestor. In 1866, this college was reorganised under the name of "The Pennsylvania College of Veterinary Surgeons." In 1851, the opening of a veterinary school in Montreal was announced by Mason and Turner (the latter a graduate of the Edinburgh School). In 1856, a Charter was sought by Wm. Cooper and seven others for "The New York College of Veterinary Surgeons."

Chapter XIV.—Army Veterinary Service during the Civil War

Previous to 1879 army veterinarians were only given non-commissioned rank, but an improvement was effected in the latter year and finally led to an Act of Congress vesting the appointment of army veterinarians in the Secretary of War and providing that only graduates of recognised veterinary colleges be chosen. This was deemed expedient in view of the fact that preventable waste is the surest path to defeat, to unpopularity of peacetime armies, to revolution, and with no notable exception in American history, to a reduction of the military forces down to a state of pathetic impotence. The failure to conserve animal strength brings despair from three standpoints: inhuman brutality, tactical inefficiency, and finally a drain on national resources which in war always reaches the borderline of popular endurance.

Chapter XV.—Changes of Army Veterinary Service following the Civil War

Immediately following the demobilisation of the armies of the Civil War, the Congress undertook a complete reorganisation of the regular army, providing among other things for four additional regiments of cavalry. The veterinary service of the army was materially affected by this reorganisation. The first gesture led to placing the veterinary service under the Surgeon-General 48 years later. War Department G.O. No. 36 sealed the fate of quackery in the United States Army, and directed that applicants for the position of army veterinarians "shall be graduates of recognised veterinary colleges."

Chapter XVI.—Development of an American Veterinary Profession

Among the civilian population the period from 1861 to 1879 saw tremendous changes in matters concerning veterinarians and in veterinary science. The public's interest in veterinary education was suddenly aroused by the precepts and examples of these pioneers and attained a high pitch of interest throughout the latter period and even earlier. The first inkling of a Federal Veterinary Service was in consequence of the great spread of Texas fever into northern territory following the Civil War, and the futile efforts of official boards and commissions to stay its progress centred general attention on E. F. Thayer of Massachusetts, and his remarkable achievements in the eradication of contagious pleuro-pneumonia from that commonwealth. The relationship of Texas fever to that disease was not definitely known until 1893, or 25 years after the scare. The Horse Plague of 1871 was another incident that gave prominence to veterinary medicine. The disease was equine influenza complicated with virulent secondary infections manifested in the form of strangles and fatal pleuro-pneumonia. In New York and Chicago this epizoötic paralysed traffic, including street cars, all of which were horse-drawn. Following the third outbreak of contagious pleuro-pneumonia of cattle (1859) the disease spread unhindered during the war except in Massachusetts. Then came hog cholera. In 1859 this disease had broken out in Ohio. It spread like the proverbial "wild fire" and by 1870 was already taking more than $10,000,000 annually from the pockets of the breeders. With regard to the beginning of the Colleges, in 1861, and during the ten to 15 years following, a number of the ablest veterinarians of Great Britain chiefly from the Royal (Dick) Veterinary College of Edinburgh, came to North America. They founded veterinary education on this continent. Andrew Smith founded the Toronto, later called the Ontario Veterinary College under the sponsorship of the provincial agricultural society; Duncan McEachran founded the Montreal Veterinary College, which later became the Veterinary Department of McGill University; James Law founded the Veterinary Department of Cornell University which developed into the New York State Veterinary College; C. P. Lyman founded the Veterinary Department of Harvard University. During the following decade (1883) Joseph Hughes from the Glasgow Veterinary College, with A. H. Baker from McGill, founded the Chicago Veterinary College. F. W. Prentice, also an alumnus of Edinburgh, founded the Veterinary Department of the Illinois Industrial University, later the University of Illinois. Thus, within a few years after the "Dark Ages" of veterinary medicine in this country, formal veterinary education was launched.

Chapter XVII.—The Status of Army Veterinary Service

The period 1879 to 1901 includes the years that elapsed between the adoption of the plan of appointing only graduate veterinarians to the position of army veterinarians and the time when by Act of Congress, army veterinarians no longer received "the rank and allowances of a sergeant-major and pay of $75 a month," but were given the "pay and allowances of a second lieutenant." The status of army veterinarians was improved. In the summer of 1881, 14 veterinarians were authorised for the ten cavalry regiments, then in the army, none for the artillery, and "as many as may be necessary" for the Quartermaster Department. Act of Congress of February 2nd, 1901, marked the beginning of veterinarians in the artillery. The first Army Instructor was Dr. Sydney L. Hunter who was assigned to the garrison at Fort Leavenworth as "Veterinary Surgeon and Professor of Hippology." The professorship had to do with the officers' school.

Chapter XVIII.—Duties and Achievements of Army Veterinarians

Extracts from Regulations of the Army of the United States, Edition 1881, show the duties of veterinarians in the army at that time. Point is made of the fact that army veterinarians were not consulted about glanders, and veterinarians were not included on purchasing boards. It seems surprising at the present time that army veterinarians did not serve on purchasing boards for horses and mules and did not pass upon the soundness of these animals at the time of purchase or afterwards, until near the time of the Spanish-American War, and then only to a limited extent. Naturally, army veterinarians saw glanders in plenty. Holcombe makes comment of this, and concluded that the prevalence of glanders in the army was in direct proportion to the opportunity offered for its spread, and that the purely fortuitous circumstance that army animals were scattered, a few at a place, over the vast western territory, was their chief protection against this disease. Influenza was the common cause of disability in army animals and accounted for much of the work of the veterinarians. Colic, of course, came in for its share of attention. It could scarcely have been otherwise, considering the poor quality of feed supplied to animals at many posts. Experience during the World War showed that "sand colic" results from feeding on the picket line for a week or longer. If the ground be sandy, sufficient grain will be mixed with the sand in this period of time to cause the animals to eat it in large quantities. During the period from 1879 to 1901, no information of value to the science of veterinary medicine was contributed by army veterinarians from their experience in army service, a striking contrast to what the same service has done since the formation of the Army Veterinary Corps. They failed to realise that in building up the scientific side of military veterinary service lay their greatest opportunity.

Chapter XIX.—Attempts to Improve Army Veterinary Service by Legislation

Much of the effort to persuade the Congress to give army veterinarians rank and to provide a veterinary corps for the army was rendered abortive because the leaders in these efforts did not understand military customs, or make allowance for the political situation then obtaining. In all probability, on two or even three occasions, this lack of understanding was the determining factor in their failure. To overcome the opposition to commissioning army veterinarians on the grounds of unfitness of some of them for commissions, a new bill was prepared which provided that commissions would be granted only after an examination of the qualifications of applicants for the position. The difficulties were increased for those who were labouring, unselfishly, to obtain much needed army veterinary legislation. *The American Veterinary Review*, and later *The Journal of Comparative Medicine and Surgery*, zealously supported all attempts to improve the veterinary service of the army by legislation. Following the increased pay provided by General Orders No. 36 in 1879, and better service accorded veterinarians, the service began to attract a better type of veterinarian. Holcombe offered a detailed plan for improvement of the Army Veterinary Service. Shufeldt, in 1887, advised those interested in improving the veterinary service of the army that the veterinary service should be organised strictly on the basis of a staff department. It was nearly 30 years from the time Shufeldt proposed this plan of organisation of the veterinary service until it was accomplished. The Veterinary Corps now has in effect its own enlisted personnel in the provision for permanent assignment of enlisted personnel of the Medical Department to the veterinary service, thus avoiding an early handicap of the Medical Corps. General Philip Sheridan visited European armies in 1887 and on his return went to Philadelphia, and with Dr. Huidekoper carefully inspected the veterinary school of the University of Pennsylvania. He was much interested in organising a veterinary service for the American army similar to that possessed by European armies, and after outlining what he wanted, asked one of his aids, Colonel Sanford C. Kellogg, and Dr. Huidekoper to prepare a bill to be presented to the next Congress providing a veterinary corps for the United States Army. Colonel Kellogg and Doctor Huidekoper prepared such a bill, setting up an elaborate veterinary service, and after a number of alterations, General Sheridan approved of it. But for the death of General Sheridan before the Congress could act on this recommendation, we might have had a good army veterinary service established in 1888. This would have given ten years to organise it and get it into working order before the Spanish-American War, and a try-out in that war would certainly have given a basis upon which to have built a practical efficient service for the World War, a service that would have saved the country millions of dollars in the cost of animals during the World War, and probably the lives of some thousands of men by making the armies in France more effective. The United States went into a war with Spain with a totally inadequate veterinary service.

Chapter XX.—The Spanish-American and Philippine Wars

The hundred or more quartermaster veterinarians that took part in the Spanish-American and Philippine Wars added nothing to the pro-

gress of veterinary science. They had no opportunity to do any research work or to make any official record of their observations. Neither the army, the veterinary profession, nor the public derived any permanent value from their services, nor any immediate advantage other than such treatment as they were able to render sick and disabled animals. The medical service of the Regular Army was as efficient as that of the volunteers was bad. The wonder is that the veterinarians did not see the advantage of being linked with such a service. The politicians, as usual, turned the popular demand for the elimination of waste in army animals to their own advantage and through the Quartermaster's Department were able to dispense a lot more patronage in appointments of veterinary surgeons and veterinary inspectors. Attention was called to the reckless expenditure in the purchase of animals totally unfit for the service, and to the terrible losses from infections and contagious diseases. From the declaration of war up to July 1st, 1898, the United States spent over four million dollars in the purchase of horses and mules. Dr. J. P. Turner, in a report to the thirty-fifth annual meeting of the American Veterinary Medical Association, September 2nd, 1898, writes as follows: "When one contemplates four million dollars being spent for war horses and mules without any proper veterinary supervision, one wonders at the recklessness of such mismanagement. The veterinary service of the war with Spain which took place in both Occidental and Oriental territory was operated without systematic regulation and without commissioned veterinary officers. It was 18 years after this war (1916) that the army veterinarians were given commissioned rank, and 22 years (1920) before a veterinary corps was established.

Chapter XXII.—An Army Veterinarian's Experience during the '90s and in the World War

This chapter was contributed by Colonel J. P. Turner, Vet. Res., an outstanding army veterinarian both before and after the days of the creation of commissioned veterinary officers. He affirms that had the Army and Congress followed the advice of Dr. Huidekoper, a well organised army veterinary service would have been ready to function when the United States entered the World War. The War Department continually opposed legislation providing a commissioned corps of veterinarians for the army, although such a corps was badly needed. All well-organised armies had such an organisation. The United States Army was a hundred years behind the times in this respect. Army veterinarians had hoped and many were assured that the army that went to Cuba would bring them a commissioned status. It failed to do so. It is difficult for a civilian to understand the deep-rooted prejudice which existed in the army, against the commissioning of veterinary surgeons in those days, but the fact remains that it did exist even in the higher ranks. The veterinary service drifted along without any organisation until 1916, when Dr. W. Horace Hoskins, by a master stroke, secured actual rank up to and including major for army veterinarians. Prior to the World War, the veterinary officers were made a division of the Medical Department, but war was declared in 1917 before a veterinary corps had been organised. It had no head and no regulations. The Medical Department was too busy getting ready for the war to give much time to a veterinary corps. Although the veterinary officers had held commissions for a year and war was looming, they had not submitted any plan to the Surgeon-General for functioning as a veterinary corps. With the excellent organisation then existing in the British Army, it seems difficult to understand why some plan of operation had not been published in the service journals or in military correspondence. The writer, like hundreds of other veterinarians appointed for World War duty, joined the divisions or remount units, and all were greatly disappointed to find nothing whatever but the old familiar Army Regulations with their two or three paragraphs to guide them. It was unfortunate that such a condition still existed. The cream of the veterinary profession offered their services to the army and did the best they could under the circumstances. A veterinary officer (Colonel Wm. P. Hill), then a lieutenant, was sent to France to observe and report on veterinary matters, a year before we entered the war. Speaking as a veterinarian who has been interested in army veterinary matters for 45 years, I can say that at present we have an excellent veterinary corps, which has administrative and technical responsibilities and is not excelled in any other army.

Chapter XXIII.—Clinical Veterinary Medicine

The birth of the veterinary profession of the United States occurred in the '70s. Until then, the health of the vast livestock industry had been left in the hands of a large number of self-made animal doctors, creatures of necessity, among whom were interspersed, here and there, a few graduates of the infant North American colleges, and a small group of adventurous foreign veterinarians attracted to this country by inviting prospects. The veterinary ethics in the '70s were such that an overwhelming majority of veterinary practitioners were non-graduates whose standard of ethics, in the main, was about the worst imaginable. The '90s were remarkable for progress not equalled in any other decade of veterinary history. It was a decade of amazing achieve-

ment, beginning with the historic work of Smith, Curtice and Kilborne when they discovered the cause of Texas fever and thus started a new era in medical research. Mallein, first employed by Kalning in 1891, is unquestionably the most far-reaching discovery in equine medicine of all time. Mallein made possible the practical eradication of glanders and brought delight to the clinician formerly harassed when confronted with evidence of that grave infection. Then tuberculin, the merits of which for diagnostic purposes were highly controversial in the '90s, soon proved its worth and led to another revolutionary change in the field of sanitary science and public health, now expressed outwardly in the approaching complete eradication of bovine tuberculosis in the United States. At the Twelfth International Veterinary Congress held in New York in 1934, veterinarians of the United States Bureau of Animal Industry were able to report that bovine tuberculosis had been eradicated from more than two-thirds of all the herds of cattle in the country and, as a result, the incidence of the disease in children has been notably reduced.

Until 1884 tetanus was a mysterious disease. It was, however, not until 1893 that Roux, Vaillard and Nocard, completing the studies of Behring, Kitasato, Cattani, Tizzoni and others, produced tetanus antitoxin in a form suitable for practical use in veterinary medicine. The experiences of the World War stand out in bold contrast to the morbidity reports of tetanus in other wars on the same ground. The soil of France is notoriously infected. Among the 100,000 American horses and mules at St. Mihiel and the Argonne, many of which were wounded in one way or another, no cases of tetanus were reported. Tetanus antitoxin was first made in the United States by Schwarzkopf and Kreuger in the bacteriological laboratory and veterinary hospital of the McKillip Veterinary College in 1894. Local anæsthesia with cocaine, although recognised in 1884 in human medicine and discussed incidentally in veterinary literature, did not come into general use until late in the '90s.

When the war was over and the profession sought to re-establish itself in the civil circle, it was taken by surprise. The colleges had failed to pay sufficient attention to meat-producing animals, small animals, and public health. The urban practitioner knew little about dogs and the rural practitioner was not well informed about the real disease problems of the dairy cattle industry. Veterinarians were not consulted about poultry. Swine diseases, including vaccination against cholera, were only beginning to become important factors in veterinary medicine. As horse practice waned in the large cities, the clinician, having failed to develop interest in the small animal field, was compelled to change stalls into kennels and practise an art for which he was ill-prepared. In rural districts the vanishing farm horse played much the same tricks on the practitioner. The number of horses and mules decreased by millions following the World War, horse and mule breeding dropped to a low ebb, and the farm horse fell in importance and value. More attention was paid to dairy cattle, to poultry, to sheep, and to swine, and not a few began to take interest in dogs. Among the innovations featuring clinical veterinary medicine during the twentieth century may be mentioned the discovery of the virus-serum method of vaccinating hogs against cholera; of filtrates and aggressins for immunising cattle against blackleg; of improved methods of vaccinating against anthrax and anthrax treatment; of canine distemper vaccination by Lockhart and the confirmation and extension of Lockhart's work by Laidlaw and Dunkin; of immunising animals against tetanus by Ramon; of vitamins; and of the value of chemical, vaccine and bacterin therapy in various diseases, much of which is too recent to belong to history. Surgery changed from the unscientific practices of the nineteenth century to the classical procedure of the present time, anæsthesia and asepsis gradually becoming the rule instead of the exception as in former times. The first third of the twentieth century must be credited also with establishing a closer relation between operations of the veterinary profession and public health, brought about largely through the campaign of the United States Department of Agriculture against bovine tuberculosis, which is generally conceded to have greatly reduced the incidence of bone, glandular and intestinal tuberculosis in children, and with the greatly increased knowledge and interest in worm parasites stimulated by the studies of Ramon, Hall, Foster and others engaged in research.

Chapter XXIV.—Private Veterinary Education

The first attempt at veterinary education, to escape a premature death or prolonged morbidity, was a college organised in New York City in 1875, as a private enterprise of a Frenchman—Alexandre Liautard. The veterinary profession of the United States is founded on a purely private enterprise. The improvement of veterinary courses, from time to time during the private school period, was brought about solely through private initiative, desire, and perhaps also through commercial competition. The private schools of the United States lacked equipment, especially scientific laboratories of histology, physiology, pathology and chemistry. The State schools of the same period lacked just about everything except the dignity of being publicly supported. Besides a Dean, the faculties comprised one, two or three

newly graduated veterinarians and certain teachers of the natural sciences in other departments. In general, the private schools were better equipped in the clinical field than were the State schools. Necessity—a vast animal industry—was more a factor in the making of capable veterinarians than were the schools. Speaking of the Early Period (1852-1875) one might well omit mention of the schools straining to survive before 1875. They represent only attempts to creat veterinary schools. They belong in history for what they are—a beginning. They had neither equipment, money, sufficient teachers, nor enough students to carry on. They were "the seeds of veterinary education" sown on a fertile but uncultivated soil. The principal support came from the ambition of their founders to be called professors and thus establish some kind of standard for their "business." Liautard became a missionary for higher standards. He preached for matriculation examinations, longer courses of instruction, and protective laws, pointing to the deplorable condition of the military veterinary service as the horrible example. Regarding the achievements of private schools, they created a veterinary profession in the United States. Beginning with nothing in the '50s, they in the main supplied the personnel for the civil and military services, from the time of the Civil War until the end of the World War; they manned colleges, experiment stations, and State and Federal veterinary departments; organised the veterinary medical associations, and induced state legislatures to enact the veterinary practice Acts which gave the veterinary profession in the United States its legal status.

Chapter XXV.—Work of Army Veterinarians

Veterinarians were regularly detailed upon boards for the purchase of horses and their duties were to pass upon the age and soundness of the animals brought before the board. Veterinarians were usually required to accompany their respective commands in the field and to take care of disabled animals upon the march. Of the diseases with which the veterinarians had to contend in government animals in the years following the Spanish-American War, shipping fever (including influenza, strangles, pharyngitis, and catarrhal fever) was the most important. While there was a tremendous amount of glanders in the concentration camps during the war, it was quickly brought under control in the cavalry and artillery. In Puerto Rico, Cuba, and the Philippines, this service confronted an entirely new group of disease conditions—surra, rinderpest, foot-and-mouth disease, contagious lymphangitis, dhobie itch, and other skin diseases; thrush, wound infection of a particularly malignant type, and glanders in plenty. Surra was probably the greatest problem with which veterinarians in the army of the Philippines were confronted. Army veterinarians were convinced that biting flies were chiefly instrumental in the spread of surra. Glanders and epizoötic lymphangitis were confusing, and the similarity of infectious lymphangitis to the farcy type of glanders led to much difficulty in control of the disease. In Puerto Rico, Griffin did a very good piece of work in investigating the types of feed available for government animals. He noted that native horses did well on a ration of molasses and grass, which was cut for feeding. The animals appeared to do more work on the grass and molasses ration than on the regular army ration. The army authorities showed no interest whatever in the experiment, nor did they make any change in the ration although Griffin's experiment would have saved $12 per day per 100 animals.

Chapter XXVI.—Efforts to obtain Army Veterinary Legislation

Failure of a bill to provide an army veterinary corps in 1901 caused lack of interest of the profession in army veterinary legislation. The bill came up for consideration in the regular session early in 1914 and largely through the influence of Mr. Hay, who had long been a friend of the army veterinarian, promptly passed the House without a dissenting vote. Being anxious to avoid opposition, it was provided that the veterinary corps might be placed in the Medical Department of the Quartermaster Department, as the President might think fit. The bill passed the Senate on April 17th, 1916. It was signed by President Wilson and became a law on June 3rd, 1916. It provided that veterinarians should have the rank, pay and allowances of commissioned officers in the grades second lieutenant to major. The American Veterinary Medical Association had worked so long for an independent veterinary corps that most of its members were much disappointed that it had been placed in the Medical Department, Turner particularly expressing his disapproval of the organisation. At the annual meeting of the American Veterinary Medical Association convened in Detroit in 1916 a resolution was introduced providing that the A.V.M.A. should compile a list of veterinarians willing to volunteer for military service in case of war, and transmit this list to the chief of the Quartermaster Department of the army as a basis of a veterinary reserve corps.

Chapter XXVII.—State Veterinary Education

The solution of our professional problems lies in a proper understanding of the origin, evolution and present alliance of our veterinary educational system. Few have taken the trouble

to study its life cycle and its pathology, and therefore, no intelligent programme has been prosecuted against the bondage blocking intelligent application of veterinary science on the farms of the United States. Colonial America possessed an important livestock industry. Between the Revolutionary War and the Civil War it grew to enormous proportions. Horses employed for industrial purposes, for pleasure, for sport, and for the individual transportation of the men of affairs, the doctors, the salesmen, and their families, thronged the streets of the cities. On the farms, which had already expanded to beyond the Mississippi, were all the animals needed for agricultural operation and development, together with a surplus, not only to provide for a rapidly increasing population but also for an export trade of considerable importance. The national wealth in livestock during that period, compared to the *per capita* wealth, was higher than it is to-day. We were an 80 per cent. livestock nation, yet no systematic effort was made to protect the animals against ravages of disease. Agriculture begged for help without making an intelligent analysis of the cause of its plight. Hopeful of checking the growing menace, chairs of veterinary science were established in various agricultural colleges. The situation was so grave that the Congress directed the Secretary of State to seek advice in foreign countries through the American consulates. An expert from England (Gamgee) was employed by the Federal Government to proffer advice on the control of the advancing animal plagues. It was not the Federal Government but the states which failed to establish scientific protection to their several livestock industries.

In 1806, Dr. Rush urged upon the Philadelphia Society for the Promotion of Agriculture the necessity for public support of veterinary education. The proposition slumbered for four decades to be revived again in Philadelphia, in 1846. In that year Robert Jennings, Senior, a self-made veterinarian and a successful practitioner in Philadelphia, delivered a course of veterinary lectures in a medical school of that city. He set about the organisation of his veterinary school, the charter for which was granted in 1852. In the same year, D. D. Slade, M.D., gave a series of lectures on veterinary science under the auspices of the Massachusetts Society for promoting agriculture, which led to the founding of the Boston Veterinary Institute. In the fall of 1854, Jennings accepted the offer of the Chair of Veterinary Science in the Ohio Agricultural College at Cleveland, which position he held till 1857. With the establishment of Cornell University in 1868, a veterinary department was included and Professor James Law, a graduate of the Dick Veterinary College, Edinburgh, was selected to head that department, which position he held for 40 years. Between 1868 and 1873, the universities or agricultural colleges of Illinois, Iowa, Massachusetts, and Ohio, established veterinary departments in which veterinary science was taught by veterinarians. In the next few years veterinary departments were established in Maryland, Connecticut, and Pennsylvania Agricultural Colleges. Early attempts to elucidate the mystery surrounding the sporadic occurrence of Texas fever in the northern territory were unsuccessful, but in 1883-84 Salmon did a remarkably brilliant piece of work in definitely locating the line north of which Texas fever was not indigenous and south of which the area was continuously infected. In 1889 the U.S. Bureau of Animal Industry undertook a systematic investigation of the disease under the supervision of Dr. Salmon and under the immediate direction of Dr. Theobald Smith, Chief of the Pathological Division of the B.A.I., and Dr. Fred L. Kilborne, director of the B.A.I. experiment station.

A complete list of the veterinary colleges in the United States is given in this chapter.

Chapter XXVIII.—Veterinary Literature

This chapter recounts the various veterinary works by American authors, English veterinary works republished in the United States, 1861-1900, and American periodicals up to 1920.

Chapter XXIX.—Organised Veterinary Medicine

The United States Veterinary Medical Association retained its original name until 1898, when, in extending its sovereignty beyond adjacent international boundaries, its name was changed to "American Veterinary Medical Association." It fought for better conditions in the educational, sanitary, clinical and research fields with decorum that now stands out as a monument to the dignity of the American veterinarian.

Incontrovertably its work led to the founding of the federal Bureau of Animal Industry and the Veterinary Corps of the Army of the United States, as organised in the Regular Army, the Organised Reserve and the National Guard.

The American Veterinary Medical Association is the largest of the veterinary medical organisations now in existence. Its membership in 1935 consisted of approximately 4,000 graduates of veterinary colleges listed as educational institutions, heretofore or now, authorised to issue evidence of qualification to practise veterinary medicine. A complete list of meetings of the United States and the American Veterinary Associations from 1863 to 1935 is given in the chapter, together with a list of the Presidents during the same periods.

(To be continued.)

N.V.M.A. Divisional Report

VETERINARY MEDICAL ASSOCIATION OF IRELAND*

MEETING IN DUBLIN

The November General Meeting of the Veterinary Medical Association of Ireland was held at the Veterinary College, Ballsbridge, on November 15th, 1935, when the following were present: Mr. S. O'Donovan (President), Professor J. J. O'Connor, Professor T. G. Browne, Professor W. Kearney, Messrs. A. F. O'Dea, P. F. Dolan, J. F. Timoney, F. J. Daly, T. A. Mernagh, H. O'Leary, F. O'Leary, J. M. Murphy, P. E. Mullaney, J. Fitzgerald, S. Conway, Jas. Doyle, P. D. Reevey, J. J. Condon, J. Morris, C. J. Pilkington, J. M. Crowe, M. J. Byrne, T. H. Griffin, Miss H. Bisset, Messrs. J. J. Dundon and P. M. MacManus.

The minutes of the last General Meeting, having been circulated to the members, were taken as read and correct and accordingly signed.

Correspondence.—A letter was read from Mr. Donnelly, Drogheda, enclosing a copy of a circular letter from the Department of Agriculture to all local authorities concerning alleged irregularities of some veterinary inspectors.

The subject matter of this letter and the manner of circulation were discussed and it was referred to Council to consider the text of the reply to be sent to the Secretary of the Department.

Resignation of Hon. Secretary.—The President reported the resignation of Professor O'Connor as Hon. Secretary of the Association after many years of good and faithful service and congratulated him on his appointment as Principal of the Veterinary College. The appointment of Hon. Secretary was referred to Council, Professor O'Connor agreeing to prepare the report for the Annual General Meeting.

Assistant Secretary.—It was agreed that Mr. Kavanagh act as Assistant Secretary until the Annual General Meeting.

Report of Council.—The report of Council was read by Professor O'Connor.

Mr. Dolan raised the question of the position of veterinary surgeons under the *Slaughter of Animals Bill* at present before the Dail. It was agreed, either that a letter be addressed to the Minister for Local Government and Public Health or that an interview be sought with Dr. Ward, the deputation to consist of Mr. Dolan, Professor O'Connor and the President.

Paper.—Mr. P. F. Dolan, Chief Veterinary Inspector, Dublin Corporation, then read a paper on "Scientific Production of Milk." The paper and the various slides exhibited were very much appreciated and Mr. H. O'Leary opened an interesting discussion which followed, Messrs. Dundon, Condon, Daly, Reeves and Crowe taking part. [Mr. Dolan's paper is reproduced, together with a report of the discussion, and of the essayist's reply, at the commencement of this issue.—*Editor.*]

The President conveyed the thanks of the meeting to Mr. Dolan, who suitably replied.

* Received for publication January 13th, 1936.

In Parliament

The following questions and answers have been recorded in the House of Commons recently:—

AGRICULTURAL RESEARCH COUNCIL

On Tuesday last Sir A. Wilson asked the Lord President of the Council whether, in view of the fact that, apart from members of the veterinary profession serving on the committees dealing with diseases of animals, there is no representative of the profession on the Agricultural Research Council, he will consider strengthening the Agricultural Research Council by the addition of representatives of the veterinary profession?

Mr. Ramsay MacDonald: It is not considered desirable that professions as such should be represented on the Agricultural Research Council. The Committee of Privy Council for the organisation and development of Agricultural Research decided, however, at a recent meeting that the representation on the Agricultural Research Council of the sciences underlying the study of animal health should be strengthened. They therefore approved the appointment of Mr. John Smith, O.B.E., M.R.C.V.S., D.V.H., formerly Director of Animal Health in Northern Rhodesia and since 1933 a member of the Colonial Advisory Council of Agriculture and Animal Health, as a member of the Agricultural Research Council.

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Attested Herds

Mr. W. Roberts asked the Minister of Agriculture how many herds in England and Wales have now been attested under the Tuberculosis (Attested Herds) Scheme; how many of these herds were previously licensed as Grade A (T.T.) or certified herds; and what the total costs have been to date in administration and in the payment of the premium of 1d. per gallon?

Mr. Elliot: Sixty-five herds have been attested in England and Wales under the Tuberculosis (Attested Herds) Scheme. Of these, 22 are herds licensed to produce Grade A (T.T.) and certified milk. The total cost of administering the scheme to date, including £1,485 in respect of the expenses incurred in a course of training of the Ministry's inspectors in the uniform application of the tuberculin test, and £1,430 in experimental investigations for improving and perfecting the technique and material used in the application of the test, is £9,600. A further sum of £715

has been paid in respect of the premium of 1d. a gallon for milk sold from attested herds through the Milk Marketing Scheme.

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POISONOUS DRUGS (MEDICAL PRESCRIPTIONS)

Lieut.-Colonel MOORE asked the Home Secretary whether, in view of the recent disclosures at coroners' proceedings that doctors write prescriptions so illegibly that in many cases the address and signature are indecipherable and of the serious developments to which such practices are giving rise, especially in the issue of drugs, he will consider taking action to ensure that prescriptions shall not be dispensed unless easily legible?

Sir J. SIMON: I have no information that would lead me to suppose that the practice referred to is prevalent or has been productive of any harm to the public. There are, as the hon. and gallant Member will be aware, various legal requirements in regard to the dispensing of poisons and dangerous drugs which seem to provide such safeguards as may be necessary.

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VACCINATION (LYMPH)

Mr. LEACH asked the Minister of Health whether rabbits are still used in the Government lymph establishment in connection with the production of calf lymph, notwithstanding the opinion of certain vaccination experts that the use of rabbits is probably the cause of the cases of post-vaccinal encephalitis which have followed the use of such lymph in recent years?

Sir K. WOOD: Yes, Sir. I am advised that there is no valid evidence to suggest that the use of rabbits in the preparation of lymph has any influence on the occurrence of post-vaccinal encephalitis.

Mr. LEACH: Will the right hon. Gentleman now consider the advisability of closing down this Department of work?

Sir K. WOOD: No, Sir.

Mrs. TATE: Is it not most undesirable that the vaccine should be transferred from calves to rabbits, in view of the fact that this entirely changes its nature and vastly increases its virulence?

Sir K. WOOD: I am not aware that that is the case.

Mrs. TATE: If I send my right hon. Friend evidence, will he give it consideration?

Sir K. WOOD: Certainly.

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VETERINARY INSPECTION IN FIFE

At a recent meeting of the Public Health Committee of the Fife County Council, a report of a meeting with representatives of large burghs in regard to a joint scheme for veterinary inspection was given by the Chairman, who said the proposal of Kirkcaldy was that they should have a radius of ten miles from the burgh, because much of the milk that came into the burgh was drawn from that radius. He could hold out no hope that the County members would agree to that proposal. The County Clerk and the clerks of the Kirkcaldy and Dunfermline burghs were to go into the matter.

The County Clerk said they had a county veterinary inspector in co-operation with the small burghs. If appointments were made for the large burghs as part of the county establishment and the costs shared between the County Council and the large burghs they would have a possible solution, but he was not optimistic that the large burghs would want to follow these lines.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Feb. 24th.-29th.—Meetings of the Society of Veterinary Practitioners at various centres (see Notices).

Feb. 25th.—Annual General Meeting of the Lancashire Division, N.V.M.A., at Liverpool.

Feb. 26th.—Meeting of the Comparative Section of the Royal Society of Medicine, at the Society's House, 1, Wimpole Street, W., 5 p.m.

Feb. 26th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., Edinburgh, 11.30 a.m.

Mar. 2nd.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

Mar. 3rd.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Carlisle, 12 noon.

Mar. 3rd.—Royal Veterinary College, Annual Ball, Park Lane Hotel, W.

Mar. 6th.—Meeting of N.V.M.A. Finance and General Purposes Committee, 2, Verulam Buildings, Gray's Inn, W.C.1, 2.30 p.m.

Mar. 13th.—Annual Dinner and Dance of the Yorkshire Division, N.V.M.A., at the Guildford Hotel, Leeds.

April 1st.—R.C.V.S. Annual Fee due.
R.C.V.S. Committee Meetings.

April 2nd.—R.C.V.S. Committee Meetings.

April 3rd.—R.C.V.S. Committee and Council Meetings.

May 7th.—Last day for nominations for election to R.C.V.S. Council.

May 21st.—Voting Papers issued, R.C.V.S. Council Election.

May 28th.—R.C.V.S. Council Election Voting Papers due.

June 4th.—R.C.V.S. Annual Meeting and Luncheon in Edinburgh.

June 11th.—D.V.S.M. Examination begins.

June 24th.—R.C.V.S. Committee Meetings.

June 25th.—R.C.V.S. Committee Meetings.

June 26th.—R.C.V.S. Committee and Council Meetings.

June 29th.—R.C.V.S. Membership Examinations begin.

Sept. 14th-18th.—N.V.M.A. Annual Congress, Scarborough.

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PERSONAL

Wills.—JEBSON, Mr. William H., of Wilton House, Pocklington, Yorks. (net personalty £5,487), £6,221.

JOHNSON, Captain Edward George, R.A.V.C. (79), of Beighton, Derby (net personalty £19,836), £21,401.

Serious Illness of Captain Noel Pillers.—It is with much regret that we have to inform our readers that shortly before going to press with this issue we received a message from Liverpool stating that Captain A. W. Noel Pillers, Chief Veterinary Officer of that city, had been taken suddenly and seriously ill. To Captain Pillers, and to his family in this anxious time, will be extended the sympathy of all our readers, who will share our earnest hope that he may be restored to a full measure of health and strength.

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Veterinary Unit for Abyssinia

The Silver Star (Abyssinia) veterinary unit, organised by the R.S.P.C.A., left England on Wednesday last for Addis Ababa, under the leadership of Colonel R. J. Stordy, M.R.C.V.S. The equipment and material, which was sent some days ago, consists of everything necessary for a field hospital for 250 horses for one year, and includes a supply of humane killers, and general and local anæsthetics.

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R.C.V.S. OBITUARY

Flynn, Patrick Thomas, Veterinary Examiner, Department of Agriculture, Dublin. Graduated Dublin, December 13th, 1929; died February 3rd, 1936.

Mark, James, Newry, Co. Down. Graduated London, January 4th, 1884; died February 8th, 1936, aged 76 years.

Mr. James Mark, M.R.C.V.S., who died in a Belfast nursing home, was for many years a leading member of the veterinary profession in the district around Newry, his practice extending into the counties of Armagh, Down and Louth. He was in practice since he qualified in 1884 until he retired a few years ago. Mr. Mark was the eldest son of the late Mr. Charles A. Mark, and his brother, the late Mr. Jacob Mark, was also a veterinary surgeon and practised at Clones. Fond of sport, Mr. Mark gave his support to many branches of it all his life, and at one time he was an enthusiastic member of the Newry Harriers. Mr. Mark was veterinary inspector to the Newry Urban Council and the Newry No. 1 and 2 Rural Councils, and he was hon. veterinary surgeon to the former Newry Agricultural Society. He was a member of the congregation of St. Mary's Parish Church, Newry. Mr. Mark is survived by his wife and one son, Mr. Jack Mark. His elder son, Second-Lieutenant James Mark, was killed during the war while serving with the Royal Irish Regiment.

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REVISED ATTESTED HERDS SCHEME: NEW DRAFT ORDERED

It is understood that after further consideration of the above scheme, Mr. Elliot has decided that a number of the proposals should be redrafted. Work on the revision is now proceeding at the Ministry. When the scheme has been approved by the Minister, the provisions for additional financial assistance will have to be sanctioned by the Treasury.

The scheme should have been introduced on October 1st, 1935. It was postponed, first for a month and then indefinitely, in order that the views of the industry could be obtained, but the Ministry of Agriculture had hoped to bring it into force on March 1st.

LEGAL NOTES

Greyhounds Stampede Cows in Calf: Shooting "Without Justification."—At Liverpool Assizes Mr. Justice Swift gave judgment in a case in which Frank Charles Minoprio, of Broadlands, Ascot, Berks, sued Robert Carr, a farmer, of Glebe Farm, Irthington, Cumberland, for damages for shooting and injuring three greyhound puppies. It was stated that Mr. Minoprio is the owner of Micawber, favourite for the Waterloo Cup.

Mr. Maxwell Fyfe, K.C., for Mr. Minoprio, said that the puppies were in the charge of a man living at a neighbouring farm, from which they strayed on to Carr's land. Two shots were heard and Carr later admitted that he shot them. Carr had 12 months previously threatened to shoot other greyhounds if they ever came on his land again.

Carr, giving evidence, said that he was on the roof of a shed in the farm when he saw his 26 cows stampeding in a field followed by the greyhounds. As some of the cows were in calf he anticipated harm, and he shot at the greyhounds. Four cows calved prematurely and one calf died, which, he alleged, was due to the cows being chased.

Mr. Justice Swift awarded Mr. Minoprio £110 damages and costs, and said that the shooting was without justification.

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Failure to Notify Sheep Scab.—Giving evidence in a case in which a North Riding farmer was fined £10 for failing to notify the police of sheep scab, Mr. E. F. Hardwick, Chief Veterinary Officer of the North Riding County Council, said he saw thousands of cases of scab during the year. On November 14th he examined a ewe belonging to the defendant and found it suffering from scab. The disease extended over the rump and tail and inside the flanks and on the abdomen. On the rump and tail there had been an oily dressing containing creosote. The dressing was nowhere else and on no other sheep. The dips in which they had been washed contained no oil. The disease appeared to have existed for about one month.

According to the Order, defendant had the right to appeal to the Ministry within three days, if his objection was supported by a veterinary surgeon, and the Ministry of Agriculture then sent its veterinary surgeon to inspect. This had been done and witness saw the surgeon take material from the infected ewe and witness despatched it to London.

Witness produced a certificate signed by Captain W. S. Petrie, stating that the sheep was affected with scab. He did not think that any veterinary surgeon experienced in sheep scab could have mistaken it, nor that there could be maggots in November. Oily dressing was an effective method of curing sheep scab. It was absolutely impossible for the oily dressing to have been caused by rubbing against a creosoted fence.

In reply to defendant's solicitor, witness said sheep scab had been reported on defendant's premises in July. Three sheep had been brought down for examination, and next morning two of the sheep had disappeared. He had not been present on that occasion, but it had been reported to him.

In reply to further questions, witness said Captain Petrie, the official veterinary surgeon for the Ministry, had made his own arrangements for the examination. He could not say why neither the defendant nor Mr. Forbes (the veterinary surgeon who had given a negative

result) had been warned when the examination was made. The question of maggots had never been raised with him. Even five dippings should not produce a necrotic surface on the skin. The effect of maggots was not to raise the skin as was the case with sheep scab.

A microscope under which was a slide containing a sheep scab parasite was produced and examined with great interest by members of the Bench.

The examination was then resumed. Mr. Hardwick said that the owner of the sheep was only required to report suspected sheep scab; he had not to make a diagnosis. On January 30th he saw the sheep and it was cured. He had ordered it to be dipped twice more to make things perfectly safe. He did not think the sheep would have been rotten with scab if nothing had been done to it from November 14th until December 29th, when it was dipped. He thought the original dressing would be efficacious in stopping the spread of scab. Scab sometimes lay dormant for months.

The defendant's solicitor said the sheep had been declared scabby by Act of Parliament, and therefore whether or not it had scab did not enter into the matter. What the Bench had to decide was whether defendant had reason to suspect scab. It was strange that if a veterinary surgeon could not detect scab an ordinary farmer should be expected to do so. Professor Wooldridge, a high authority, had declared the great difficulty of differentiating between sheep scab and maggots. As a reasonable man, could the defendant be expected at once to differentiate between the two things?

The defendant said when the patrol shepherd came along the ewe alleged to be suffering from scab was running in his flock. The flock had been frequently dipped, the last dipping being on November 9th. On September 19th he noticed the ewe rubbing against the fence, as she had maggots. From November 11th onwards the ewe was isolated in a hen-house, and no treatment given until December 29th. He had not treated the ewe specially. At the last dipping there was a lot of brown grease in the dip.

When the ewe was examined by the veterinary inspector it was stated that the sheep had scab, but no parasite was found. If the sheep had scab, and had not been treated from November 14th until December 29th, it would have been rotten. Captain Petrie had not shown him the parasite.

Replying to the solicitor for the prosecution, defendant said he knew a scab parasite when he saw one. He recognised the object under the microscope as a scab parasite, but he disputed that it had come from his ewe. The ewe was not suffering from maggots in November, but from hard skin the result of maggots. He knew his duty under the Order was to report cases of suspected scab. He had not been aware of scab and so he had not reported. He was still convinced that the ewe had never had scab.

Mr. Alexander Forbes, M.R.C.V.S., said he had a little experience of scab, and agreed with Professor Wooldridge that it was very difficult to differentiate between scab and the hard scurvy skin surface produced by maggots. On November 15th he saw the sheep. The skin was hard and almost necrotic, and he thought this was due to excessive dippings, the ewe having been dipped five times. Last season farmers had a good deal of trouble with maggots, which were usually treated with dips or turpentine. He found no sheep scab there. If the sheep had scab and had been left untreated from November 14th until December 29th the trouble would have spread considerably.

Cross-examined, witness said he examined the sheep thoroughly but could find no yellow, waxy material, which Professor Wooldridge described as being rich in parasites. It did not appear to him that there was any material to take, from which to discover scab. Witness was aware when he went to see the ewe that scab had been diagnosed, but he could find no active parasites. He did not make a scraping. There was nothing visible to make him or certainly any layman think the sheep had scab.

The chairman said that, after very careful consideration, the Bench found defendant guilty.

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Swine Fever Danger from Unboiled Offal.—A warning was given at Launceston County Sessions, that leaving unboiled offal to the access of animals was likely to be responsible for the spread of swine fever. This statement was made by Superintendent Burrough, in a case in which a defendant was fined for leaving unboiled offal to access of animals.

Superintendent Burrough said the offence was looked upon by the Ministry of Agriculture and the police as somewhat serious, because during the year a number of outbreaks of swine fever in the county had given rise to considerable concern. There was still an abnormal number of cases in the county, and unless the regulations as laid down by the Ministry for the prevention of swine fever were properly carried out, there would be great trouble in ridding the county of this disease. Last year there were over 60 cases in the county as against eight the previous year.

A fine of £1 including costs was imposed.

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Imprisonment for Neglect of Pigs.—For cruelly ill-treating 18 pigs by omitting to supply them with proper care and treatment James Henry Lonsdale, 32, a farm labourer, of Down Barns, Northolt, Middlesex, was sentenced at Ealing to three months' imprisonment with hard labour. Mr. Walter Davies, the chairman, described it as a case of the grossest cruelty and as one of the worst which had been before the Court.

Police-constable Heathcote said in evidence that at Medlar Farm, Northolt, he saw 13 four-month-old pigs, all dead, and five live ones. The living pigs were emaciated and could scarcely walk. In the pen were two crusts of bread and two potatoes and the trough was full of dirt. Lonsdale was in bed with lumbago.

A veterinary surgeon said that one of the dead pigs had a wound behind the ear as though the others had been gnawing it. The pigs had been suffering from a disease which rendered them unable to take their proper food, and there was a suspicion of swine fever.

Lonsdale explained to the Bench that he had fed the pigs regularly until he was taken ill with lumbago, when he asked another man to look after them.

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Working a Horse in an Unfit State.—A defendant at Hendon Police Court was dismissed from one summons, was called as witness for another defendant and was immediately served with a new summons which placed him on his defence again. Leslie Coombs (21), of Alexandra Road, Hendon, a milk roundsman, was charged with cruelly ill-treating a horse by working it

while in an unfit state at Temple Gardens, Golders Green, on January 25th, and Leslie Bloom, 191, Kilburn Lane, Queen's Park, was summoned for permitting the cruelty.

P.C. Hunt, who said the horse was attached to a United Dairies milk van, gave evidence as to the presence of sores under the saddle.

Mr. George N. Bushman, veterinary surgeon, said the saddle rested on a large sore and would cause considerable suffering. The horse was extremely irritable but he could not say whether it would have been so without the sores. Otherwise the horse was in good condition.

Mr. McGregor, for the defence, pointed out that Bloom had been summoned as the owner of the horse. He was not, and the summons must therefore fail. The Bench agreed and dismissed the case again Bloom.

Coombs said that the horse developed sores and was rested for ten days, but he took it out again about a week before the present incident. It appeared to be in good condition. It was not his duty to harness the horse and he would not look under the harness. On the day in question the horse appeared to be in its usual condition, but it was always irritable and this did not lead him to think there was anything wrong.

Bloom was called as a witness for the defence, but the police asked for an adjournment with a view to proceedings being taken against the owners. It was decided by consent, however, to serve a summons on Bloom for causing the animal to be ill-treated.

Bloom pleaded not guilty and said he was a stableman employed by United Dairies. He had many horses in his charge. This particular one was a very restless animal which would kick and bite when it was fit and well. It was rested when it had sores and was considered cured when it went out again.

Mr. Frederick Harold Stainton, veterinary surgeon, said the condition of the sores could have occurred in one day. The horse might have been fit when it was sent out.

Sir Alfred Baker (chairman) said the Bench thought this was a case of shocking cruelty. Coombs was fined £3 and Bloom £5, and they were ordered to pay £1 2s. 6d. costs each.

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INTER-COLLEGIATE RUGBY

Dublin *v.* London

After a stormy crossing by the London visitors on February 7th, the annual rugby match between the Dublin and London Veterinary Colleges was played at Dublin on the morning of February 8th.

From the kick-off the Irish forwards took the ball down the field and were soon attacking, but the pressure was relieved by clever kicking by Wooldridge. The London side then attacked and were almost through in the centre several times. During this period a drop at goal only just missed.

Another fine rush brought the Irishmen up the field and Kelly dived over for a try which Doyle converted.

Half-time came with no change in the score and then continuous pressure was exerted on the Irish line. From a quick heel the ball went along the line to Morgan, who scored an unconverted try in the corner (5—3). The Irishmen were now practically penned in their own half and only resolute tackling and spoiling prevented any further score.

"No side" came without any addition to the score, the Dublin fifteen winning by 1 goal to 1 try.

SCIENCE AND THE PROBLEMS OF SOCIETY

Speaking on the above subject at a luncheon given by the National Institute of Industrial Psychology, Professor Julian Huxley said they had been told that they lived in a scientific age, and probably, compared with other ages, it was so. But, on the other hand, it was by no means a fully scientific age; in some ways it was scientific, in others very unscientific. There were a large number of examples where the results of science were misapplied; sometimes not applied at all, frustrated and distorted, and so on. The most obvious example was agriculture. They had had 30 or 40 years of the most remarkable achievements in applied biology in breeding animals and plants. The result with regard to wheat was that instead of increasing the wheat area the great wheat-growing nations were trying to reduce the area. Many agriculturists looked a little sour at the results of this intensive work.

Problems which concerned the producer and the State were receiving official attention at the expense of problems which concerned the consumer and the individual. The most striking example was that of health. It was a lamentable fact that, although knowledge of how to encourage good physique, good health, and resistance to disease had greatly increased, yet relatively little had been done to employ that knowledge. A benevolent dictator—if there could be such a thing as a benevolent dictator—could at relatively small expense add two inches to the stature, pounds to the weight, and an enormous amount to disease resistance. The provision of milk to necessitous children was the thin edge of a very big and important wedge. Yet that was not done primarily at the instance of the Ministry of Health or the Board of Education. It was done at the instance of the Milk Marketing Board to find an outlet for surplus milk. This was a very interesting and significant point. The interests of the individual and the consumer were on the whole neglected.

The producers and the State were highly organised organisations; the consumer and the individual were not organised. How were they to find a remedy for that state of affairs? When they looked further into the question they found that inertia in official quarters and the pressure of vested interests were making them a nation of lop-sided scientists. While vast sums of money and some of the best scientific brains in the country were employed in the interests of war and destruction, almost nothing was being done in the direction of sociological and psychological research.

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GREY SQUIRREL PEST: MINISTRY'S APPEAL

"The grey squirrel is again becoming a serious pest of the countryside," states the Ministry of Agriculture in a recent announcement. "In 1931 its numbers in this country were greatly reduced by an epidemic disease: it was, consequently, much scarcer in 1932 and 1933. Investigations in 1934 and 1935 showed, however, that the pest had made a substantial recovery and was spreading over fresh areas.

"Those who know the grey squirrel for what it is view this position with alarm, for the damage done by it, as quite distinct from the red squirrel, is considerable both over the countryside and in town parks and gardens. This damage consists mainly in the destruction of young birds and eggs, the young shoots of trees, fruit tree buds, and ground crops of various kinds.

"The Ministry hopes that farmers and all others connected with agriculture or horticulture will do their utmost, therefore, to encourage the destruction of grey squirrels by shooting and trapping, and so prevent them from spreading into other districts and establishing themselves there. It is important on this account that strong measures against them should be taken even where they are few in number.

"Concerted action by all concerned is, therefore, recommended to be started for this year at once, and continued unremittingly, so that the numbers of grey squirrels may be reduced as much as possible before the breeding season."

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CO-OPERATIVE AUSTRALIAN INVESTIGATIONS INTO MASTITIS IN DAIRY COWS

The November, 1935, issue of *The Journal of the Council for Scientific and Industrial Research* (Commonwealth of Australia publication) contains the announcement that a commencement has recently been made in Victoria with the co-operative investigations into mastitis in dairy cows rendered possible by the provision of funds by the Australian Dairy Cattle Research Association and by the participation of various bodies.

In the course of a preliminary examination of the position that led up to the initiation of these investigations, it is stated that contagious abortion and mastitis are two of the most important problems confronting the Australian dairying industry and that the Association to which reference is made above was set up by the industry primarily to foster Australian investigations into these diseases.

Funds were obtained by contributions from various sources, as a consequence of which the Association, in July, 1935, was able to see its way clear to provide £3,750 per annum for mastitis work over a period of years. The Council for Scientific and Industrial Research was then asked to undertake the investigations in association with the Victorian Department of Agriculture and the Veterinary Research Institute of the University of Melbourne. The Council agreed, and the following arrangements have been made for the control of the work. The Chief of the Council's Divisions of Animal Health and Animal Nutrition (Dr. L. B. Bull) will be in charge of the investigations; but, while he will be directly responsible to the Executive Committee of the C.S.I.R., he will be made a member of the Victorian Sub-Committee of the Association, so that he may maintain close touch with its members, to whom reports will be presented from time to time. In addition, the Chief Veterinary Officer of the Victorian Department of Agriculture (Mr. R. J. De C. Talbot) and the Director of the Veterinary Research Institute of the University of Melbourne (Dr. H. E. Albiston) will be associated with Dr. Bull in the direction of the investigational work.

A property extending to 350 acres has been acquired in the neighbourhood of Berwick, some 30 miles from Melbourne, and the main activities to be carried out there will be directed in the first instance towards establishing a clean herd, the object of such action being (i) to provide facilities for the detailed study of clean animals; (ii) to provide clean animals for introduction into affected herds for purposes of observation; and (iii) to determine whether the disease can develop in a clean herd apart from the introduction of infected cows. In other words, the work at "Road's End"—as the property is called—will consist, broadly, of a study of the normal cow from the point of view of its acquiring mastitis.

The disease is also to be studied as it exists in selected dairy herds in localities around Melbourne. The bacteriological work involved will be largely centred at the Veterinary Research Institute of the University of Melbourne.

Correspondence

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

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VETERINARY SERVICE, PRESENT AND FUTURE

To the Editor of The Veterinary Record

Sir,—The two letters appearing in your issue of to-day under the titles "Tolerance" and "Cleavage," respectively, intrigue me greatly as the expressions of "Two minds with such vastly different thoughts," the one breathing the spirit of reorganisation, reasoned compromise and goodwill, the other that of die-hard reaction, and that irascible impatience with the views of others, which inevitably produces "cleavage." May I suggest that Mr. Hugh Begg is seeing "bogies" where none exist, and is unnecessarily alarmed by mistaking a healthy aliveness to the vital and important evolutionary changes which are now shaping the destinies of the profession, for a mischievous desire to secure a mere numerical dominance in its Councils.

As another "student of veterinary politics, now devoid of any stake in the issue"—having retired from general practice twelve years ago—may I suggest that if your correspondent had happily continued in his retirement to take active part in the work of the "National" and its committees, he would have found many indications of a spirit the direct opposite of that which, from his distant retreat, he conjures up and would have your readers believe to exist.

The main burden of Mr. Begg's present plaint appears to be, that there is a conspiracy by an "organised caucus to clear the decks of both our ships of State"—the Councils of R.C.V.S. and N.V.M.A.—of what he calls the "remnants of whole-time officials" upon them, and to substitute a general practitioner dictatorship.

Let us examine the present figures of these "remnants." The R.C.V.S. Council consists of 36 members, and, as far as I can make out, of these, 17 are general practitioners, and 19 are "other than practitioners." Let us now analyse the figures of the Standing Committees of N.V.M.A., each consisting of 15 members.

Committee	Practitioner Members	Other than Practitioners
Appointments	3	12
Finance and General Purposes	7	8
Veterinary Officers and Public Health ...	10	5
Organising	10	5
Parliamentary (one vacancy)	6	8
Editorial	3	12
Special "Free Service" Committee	6	6
Totals ...	45	56

It appears, therefore, that when we substitute cold facts for fancies we find that, although practitioners form the vast majority of the electorate, far from swamping or "clearing decks," they are in a minority on both Councils. The truth seems to be, that general practitioners are not, and never have been, equitably represented in either Council, largely due to the difficulty of securing suitable men who could afford the time and money to give the service. If, now, when their very existence is threatened, they exhibit an interest in the bodies which to some extent control their destiny, and seek more adequate representation within them, I see no sinister designs but, on the contrary, the awakening of a healthful corporate sense, which is the rightful due of their paramount interests, and which should be highly beneficial to the body corporate. In short, my diagnosis is "physiological" as against the "pathological" diagnosis of your correspondent.

In other communications of late your correspondent has voiced his complete dissatisfaction with the conduct of the affairs of the "National," and of its journal. Your editorials, leaderettes, the reports of Divisions, the "correspondence you are *compelled* to publish," and the clinical articles appearing—all have in turn come in for the lash of his whip, and nothing seems right. You, Mr. Editor, can no doubt well take care of yourself, but I feel entitled to ask Mr. Begg to glance at the figures of the membership of the Editorial Committee just cited, and to absolve practitioners, at least, from dominating that or being responsible for its supposed "crimes."

Your correspondent also suggests that whole-time members of our ruling bodies are being "ostracised," and made uncomfortable within them, even to the point of their possible secession. The most important committee of the Council which has sat for many years was that which evolved the N.V.M.A. Scheme—Mr. Begg may not admit this—and that committee was not only generously representative of whole-time and every other interest, but its members would seem to have worked together without any appearance of that "rancour," "acidity" or "discomfort" in each other's presence which is suggested, and ultimately produced an agreed scheme instinct with statesmanship and the wisdom of that spirit of compromise which is the salt of the life of individuals and of corporate bodies alike. Such co-operation and harmonious working, especially considering the highly controversial nature and gravity of the matters at issue, speaks volumes to refute the truth of the existence of the intolerant spirit your correspondent voices, and I venture to think this is applicable to all committees of the Council.

The suggestion of Mr. Begg, that it is the deliberate purpose of the organised body of general practitioners to swamp with its own members, the Council and its committees, is as utterly untrue in fact as it is unbacked by a tittle of evidence either from Mr. Begg or anyone else.

If Mr. Begg in writing of "this overwhelming and organised caucus," refers to the Society of General Practitioners, may I say that the suggestion is singularly incorrect with regard to this body. Immediately it was formed in September, 1933, it took the earliest opportunity possible to request the Council's acceptance of it as a Division of the "National," and is therefore subject to the rules and discipline of the parent body. By contrast, the Society of Veterinary Officers is also a highly organised body, but has consistently refused to come within the parent body, whilst having many representatives on the Council and committees of the "National," yet Mr. Begg has no word of disapproval of this already existent "secession" of the officers from what should be their parental roof.

Far from indulging in the sinister policy suggested by Mr. Begg, let me quote what the Hon. Secretary of the Society of Veterinary Practitioners, Mr. Steele Bodger, said at its last annual meeting, as reported in your issue of November 16th:—

"At this point I should like to issue two warnings: firstly, it is both necessary and desirable that this Society should grow in strength, but not with the object—and I say this emphatically and in all sincerity—of swamping committees and Councils with our members but so that this Society, when it speaks, shall be in the position to speak for the large majority of general practitioners. Secondly, I would impress upon you, that numbers alone will not make us strong, but our strength will lie in the individual effort which every member contributes.

"I would like the other sections of the profession to believe that the *raison d'être* of this Society, is to protect the interests of the general practitioners so that they may be best fitted to be of service to the 'National' and the profession and public as a whole, and that it is not the object of the Society to strangle each or any other section of the profession."

To my mind, there, speaks the voice of a loyal member of the crew of the "National" ship, as it is also the voice of the responsible Council of the Society of Veterinary Practitioners, and of its members as a whole. The Society of Veterinary Practitioners stands solidly in support of the N.V.M.A. scheme for public veterinary service, and this scheme visualises general practitioners working willingly under the direction and supervision of whole-time officers. The Society has no issue with whole-time officers as such, but rather with the policy and procedure of those county and municipal authorities which direct or permit their activities to take such forms as seem to it to be unjustified in the public interest, to be destructive economically and in prestige of the general practitioner, and derogatory to the ultimate solidarity and dignity of the profession.

In my view, the formation of this Society has done more than any movement in recent times to rouse an interest in the domestic politics of the profession, to shake the rank and file out of its persistent and deplorable apathy, and to create among us a real and living corporate sense. The "mountain is in labour" and the issues of the time are so instinct with either triumph or disaster for the profession as a whole and those they serve, that "effervescence" may be expected at times, but in my view such ebullience is surely better than the stagnation of death or decadence, and no disastrous forebodings need be entertained. Let practitioners take heart of grace, and rightly appraise this attempt by your correspondent to create a reactionary spirit within the profession against their well-founded demands to be considered as an integral and indispensable part of the Public Services, and not as being of no account.

With respect to Mr. Begg's final Latin question, one reply in simple English might perhaps be, "No, the voices of reasoned fact, equity and compromise, alone can prevail amongst men of goodwill."

Yours faithfully,

Mold, North Wales. Edward P. Edwards.

February 15th, 1936.

To the Editor of The Veterinary Record

Sir,—I cannot allow certain inferences contained in the correspondence columns of the current issue of *The Veterinary Record* to pass unchallenged.

That the problem of whole-time veterinary officers, or, a combination of whole-time and part-time veterinary officers, is a very real and most serious one, especially for the general practitioner with a small practice, cannot be denied. That a certain number of whole-time officers are necessary for administrative purposes, for co-ordinating the work of a staff and for discipline, is recognised by most, if not all, of the members of our profession.

Two questions are asked:—

1. What inroads into the work at present being done by the general practitioner are going to be made by the whole-time official?

A *frank* reply would not be in the public interest, in so far as some whole-time officers are concerned, and a considered and diplomatic reply may be available when the special committee have reviewed the questionnaire which has been issued.

2. Can the practitioner be incorporated in a State service? My reply is an emphatic affirmative, for the reason that he possesses the diploma R.C.V.S., concerning which the Council have asserted, on two occasions recently, that "This qualification is a guarantee to the public that the holder is fully qualified to practise ALL branches of his profession. What further qualification does the whole-time officer possess? In the *majority* of cases he is very much wanting in experience, which the *majority* of part-time men would possess; the necessary discipline and knowledge of administration, if not already possessed, could very soon be acquired under an efficient and practical chief officer.

Mr. Tweed states that "it would be interesting to know the views of some practitioners as to how to prevent the employment of whole-time officers." In reply, I have never heard a general practitioner suggest that they *should not* be employed, but they do object and strongly, to being entirely supplanted by these gentlemen. Further, in either case, the public would find the necessary funds and that whole- or part-time officers should be equally capable of giving competent service.

Mr. Tweed also stresses the need of "confidence and loyalty" among the members, both whole-time officers and practitioners; with this I heartily agree, and I would ask Mr. Tweed who is the offender, if this harmony does not exist? I have been a member of Council, N.V.M.A., for 20 years and it would take too much space to recount the times innumerable that we have been called upon to fight with the authorities, for justice for whole-time officers and usually with success: I think that whole-time officers, as a body, owe us their gratitude.

Another correspondent suggests the danger of the occurrence of "schism" in our ranks; surely he does not fix the blame upon the practitioner? Mr. Begg will remember that certain special advisory committees and commissions have been set up within the past few years, to consider animal diseases and reorganisation in connection with the milk supply. Certain witnesses were called to give evidence before these bodies, amongst whom were certain eminent whole-time veterinary officers. Applications have been made from time to time by the N.V.M.A. to the authorities concerned, that we may have a copy of their evidence. This has been refused, upon the ground that "it was confidential." This occurred after the reports of these bodies were published, from which it appeared very clear that considerable influence had been brought to bear upon the several commissions and committees, in favour of whole-time officers to the total exclusion of part-time officers.

It is apparent that a grand opportunity was lost for a considered and *just* policy on the subject being placed before the authorities, as the policy of the N.V.M.A. A large number of whole-time veterinary officers are members of Council of the N.V.M.A. although their own Society has not become one of its Divisions.

As a member of the Nominations Committee, I would like to assure Mr. Begg that every effort is made to ensure that the whole-time service shall be adequately represented on committees; also to accede to the request of a member to be placed on a certain committee.

I emphatically deny that the "cleavage" in our profession, if such cleavage exists, is the fault of the general practitioner, who, to my mind, appears to be "nobody's child," and like John Citizen, is liable to be robbed of his just dues, and is condemned if he raises a finger in self defence.

Does Mr. Begg see fear that the composition of the Council R.C.V.S. may be more equally balanced at the ensuing election, by the infusion of a few more general practitioners? So far as I can ascertain by the records, ever since the Charter was granted in 1844, teachers and whole-time officers have unreasonably preponderated on the Council to an overwhelming extent. Is this as it should be, for the benefit of the profession as a whole?

I have nothing but praise for Mr. Steele Bodger's diplomatic, well considered contribution. I shall be glad to see true harmony established between the two bodies, as such they appear to be, for the purpose of uplifting the profession as a whole, both socially and scientifically. To this end, I would suggest that the whole-time Veterinary Officers Society become a Division of the N.V.M.A. and that, immediately that takes place, a special sub-committee, fully representative of both parties, be set up, to discuss the possibility of formulating a policy for the future, by which all branches of the profession should obtain the utmost benefit and public respect.

Yours faithfully,

J. C. Coleman.

Swindon.

February 16th, 1936.

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THE PROSPECTS OF YOUTH

To the Editor of The Veterinary Record

Sir,—The careful consideration of "leaders," reports of Divisional meetings, correspondence and the "questionnaire," have a very depressing effect upon the young practitioner in the early stages of his career in our honourable profession. The burning question becomes, "What are the prospects for the new generation?"

I can only pen my own impressions, but I feel they will be endorsed by my contemporaries. First, one cannot but help diagnosing a slow insidious disease, with an unfavourable prognosis. The grim words "reorganisation," "supervision" and "regimentation" are freely used—reorganisation, either on the lines of nationalisation, or pseudo-nationalisation; both necessitating extensive regimentation. Secondly, the choice open to the young graduate may well be three-fold: (i) Whole-time employment, (ii) part-time employment "*under supervision*"; (iii) luxury practice.

Whole- and part-time employment will be eminently suitable for those who require a "safe" job, with possibly superannuation schemes to cover their retirement in old age. But what of the effect upon the outlook and moral fibre of the men accepting these posts? That impetus to the development of one's clinical ability, upon which agriculture is greatly dependent, *i.e.*, the necessity of becoming successful upon one's own merits in order to earn a living, will be lacking; and lacking this impetus an element of complacency and self-satisfaction in the bare achievement of one's graduation and post-graduate degrees will develop, with a consequent failure to improve one's capabilities.

Apropos these last remarks, I am firmly convinced that, in the best interests of our profession, no member should be granted a whole-time appointment until he has spent at least five years in the rough and tumble of general practice. If this idea were put into practice I feel sure that half the so-called friction, said to be existing to-day, would vanish and the whole-time services gain in efficiency.

The Secretary of the Society of Veterinary Practitioners, in the current issue, says, "Supervision is good for us all . . ." Why? Why?? Surely this sounds a note of self-abasement, and of a lack of self-confidence. Supervision would undoubtedly serve to bolster up the less competent, whose footsteps were faltering; but the energetic man with initiative and courage will do his job, succeed and deserve well of the public without it.

Up to the present day our profession, through the strenuousness of our calling, has absorbed only men of the finest type. If luxury practice is the only alternative to the soul-killing employment envisaged in the near future, the type of man offering himself for enlistment to our ranks will change from the hard-working independent type, whom we younger men admire and upon whom we try to model our daily lives and conduct, to that of the "gentle" creatures whom one meets daily in the routine-ruled regions of bureaucracy.

To the senior members of the profession, upon whom now rests the responsibility of framing the policy which will affect the future of the younger generation, and of the generations yet unborn, I address this plea: "Save the profession from nationalisation, and safeguard our heritage of freedom of thought and action."

Youth does not require "spoon-feeding,", and if any of us cannot stand up to the pressure and responsibilities of modern conditions, we will "go down." Such has been the way of life since the dawn of time.

Your faithfully,

T. A. R. Chipperfield.

Cranleigh,
Surrey.
February 16th, 1936.

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FISTULOUS WITHERS AND POLL-EVIL—CALCIUM THERAPY

To the Editor of The Veterinary Record

Sir,—I desire to associate myself wholeheartedly with the Fellows of the Central Division who in such laudatory terms recently expressed their admiration of the work done by Mr. J. S. Steward on *Onchocerca cervicalis*, and congratulated him upon having brought his investigations to so successful a conclusion. It is as a clinician, however, that I wish to add to the discussion. "Everytime we use a knife we make a confession of failure" was the remark made by a physician many years ago in an article in the lay press and I have for long been intrigued by it. Nevertheless, I have been as keen on surgery as anyone and have had considerable success in my poll-evil cases. Briefly, my procedure is to remove the cordiform portion of the ligamentum nuchæ as is now the custom, taking care to make my wound less narrow and less deep at the distal end, and bringing it to a point, which ensures that there is no stump to retract into the tissues of the neck—a cause of post-operative abscess. The wound is packed with cotton wool, retained by two or three strong sutures; in a few days the wool is raised and a culture of Reading bacillus sown under it; the stitches are then removed without disturbing the packing and the patient is turned out in a field. No further treatment is adopted though it is admitted that appearances are not all that they might be, but then we must remember that Nature herself is the best healer.

I have had my surgical successes, too, with fistulous withers but, eight years ago, on being called to a thin horse with enormous fluctuating swellings on both sides of the withers I adopted another line of treatment. Why I did so I do not know—whether it was my own idea or that of someone else I do not remember; if the latter, I am sorry for my forgetfulness, as I have the strongest objection to laying claim to ideas which are, in fact, those of others—but I removed all serum as far as possible by means of the equine trocar and cannula and injected the horse subcutaneously with two ounces of calcium gluconate in solution in order to bring about coagulation of any serum remaining. The cavities partly refilled and were firm to the touch; absorption was gradual and in a month there was nothing to be seen. The patient's condition had also improved so much that the owner immediately afterwards sold for £18 profit and he informed me, ten days ago, that the horse is still working on a farm two miles away and has had no recurrence.

I can recall seven or eight cases, similarly treated since, with equally satisfactory results; three were lanced and allowed to discharge but all the others had the serum removed by trocar and cannula. A case of poll-evil, also tapped, is at present under the same treatment and there are indications 16 days later, that it, too, will be a success. The swelling has completely disappeared on one side; that on the other is less in size, firm to the touch and without any fluctuation whatever. In none of my cases has there been any sign of diseased bone, but whether this complication arises in old-standing cases only I cannot say.

No opportunity has yet presented itself of making a *post-mortem* examination of any of the above animals, but the opinion is held that the *Onchocerca cervicalis*, if present, is in all probability calcified and thus rendered harmless.

Yours faithfully,

W. W. Lang.

Brigg,
Lincolnshire.
February 17th, 1936.

With a view to increasing the number of an almost extinct race of cattle, 20 Canadian buffalo cows are being sent to the Zoological Gardens at Berlin, to be distributed among the few remaining flocks of bison in Central and Eastern Europe.